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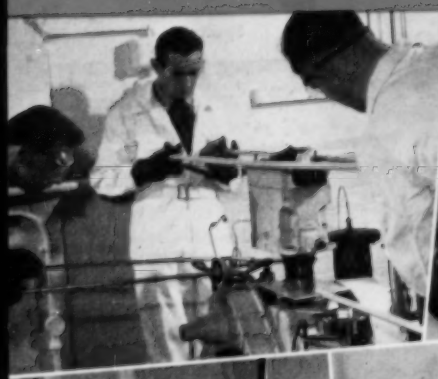

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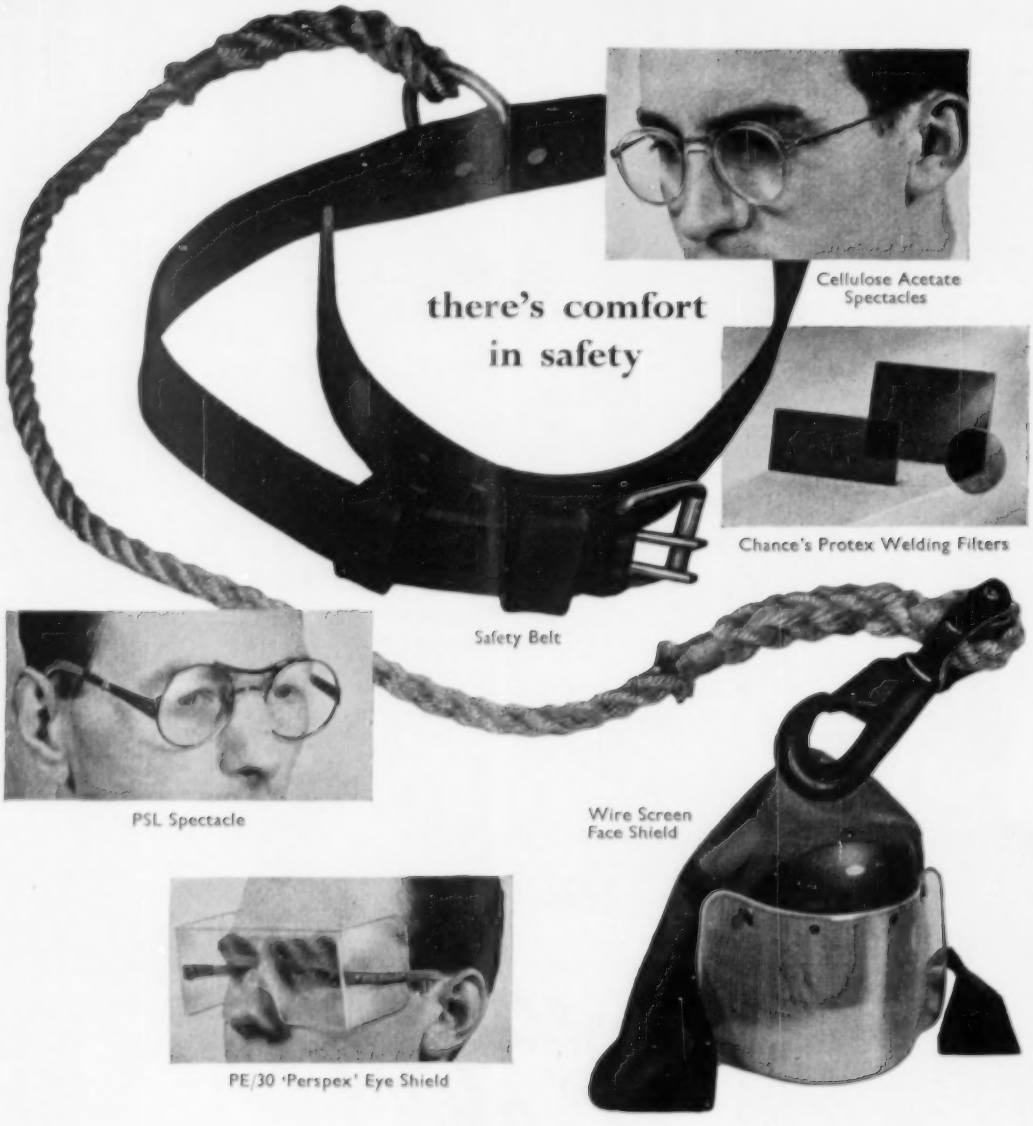

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✳ Which employees are fit to become executives?

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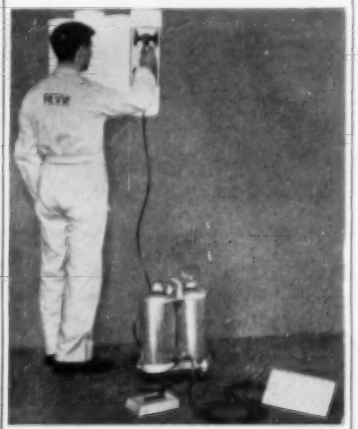

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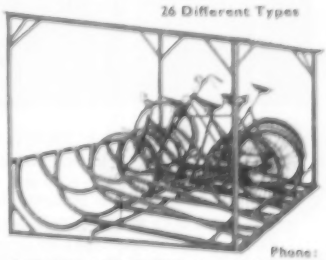

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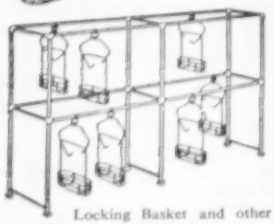

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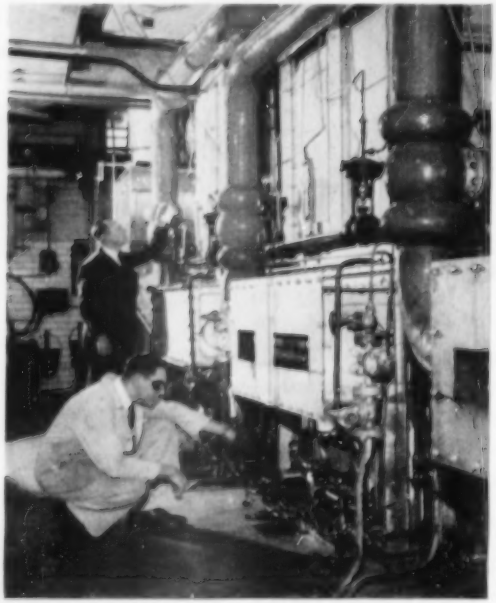

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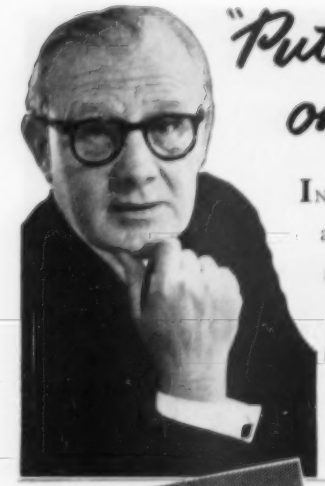

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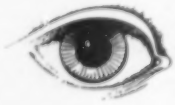

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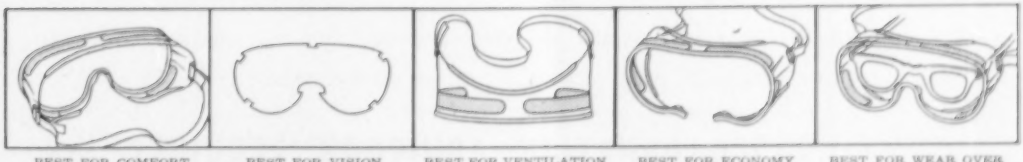

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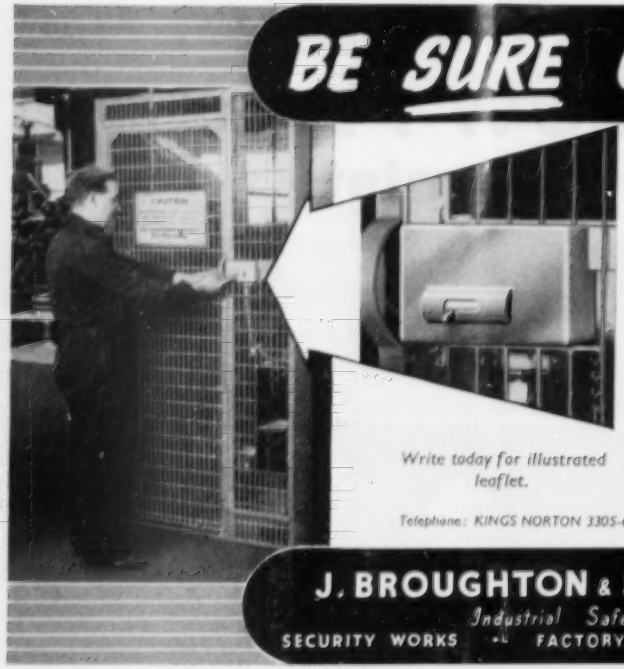

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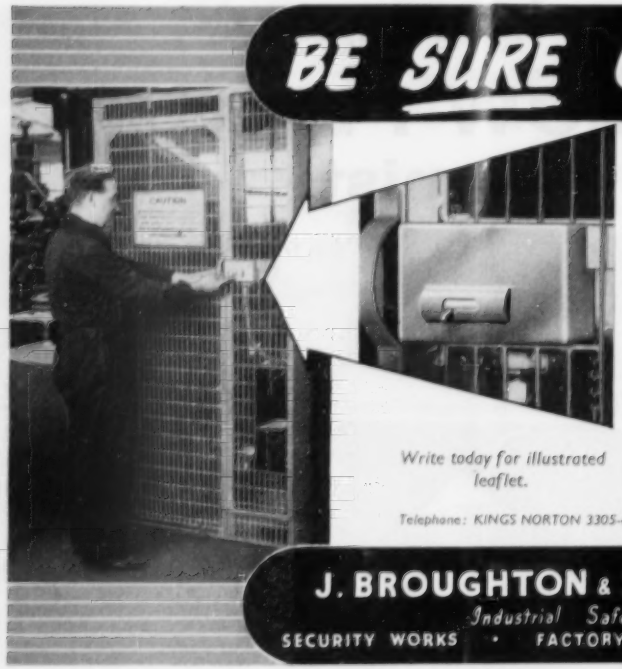

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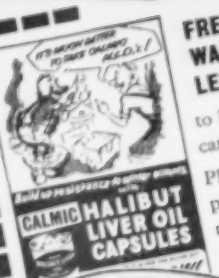

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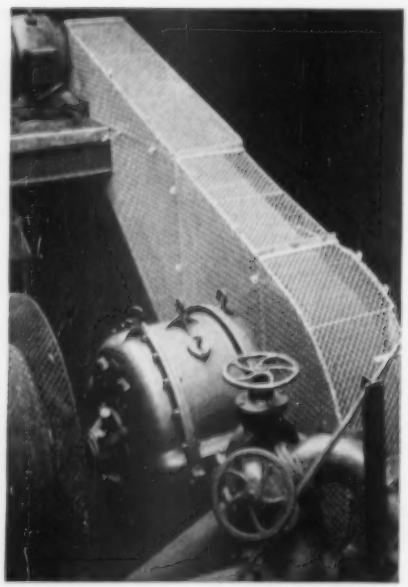

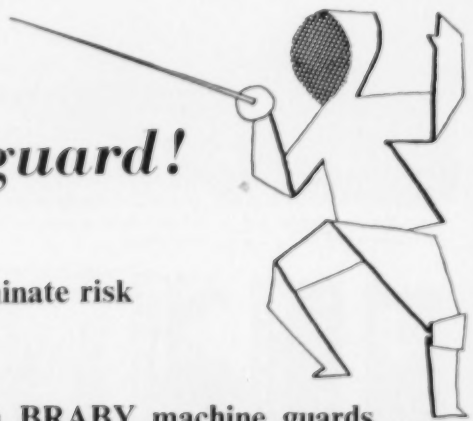

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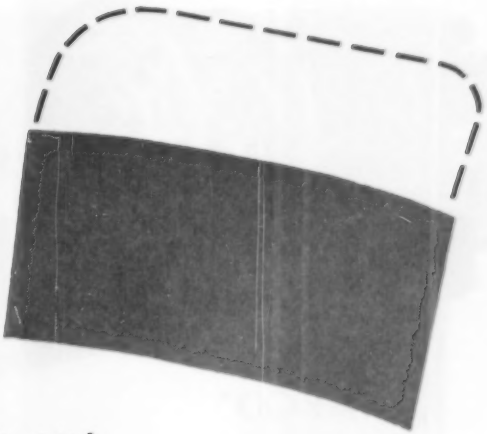

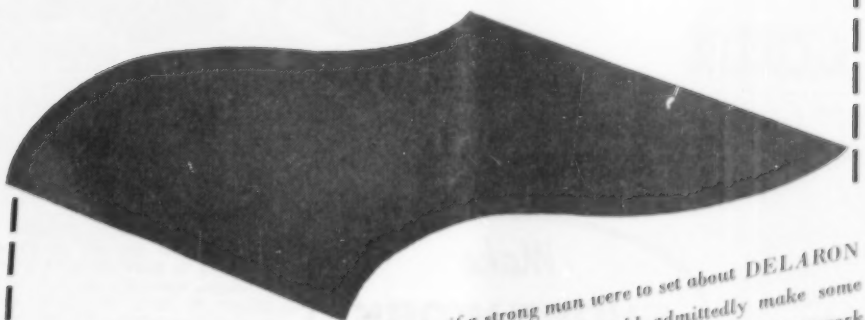

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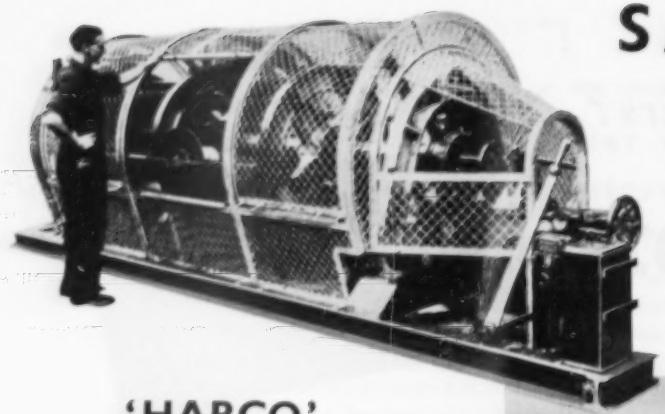

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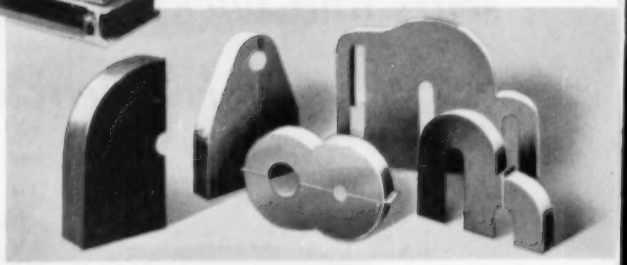

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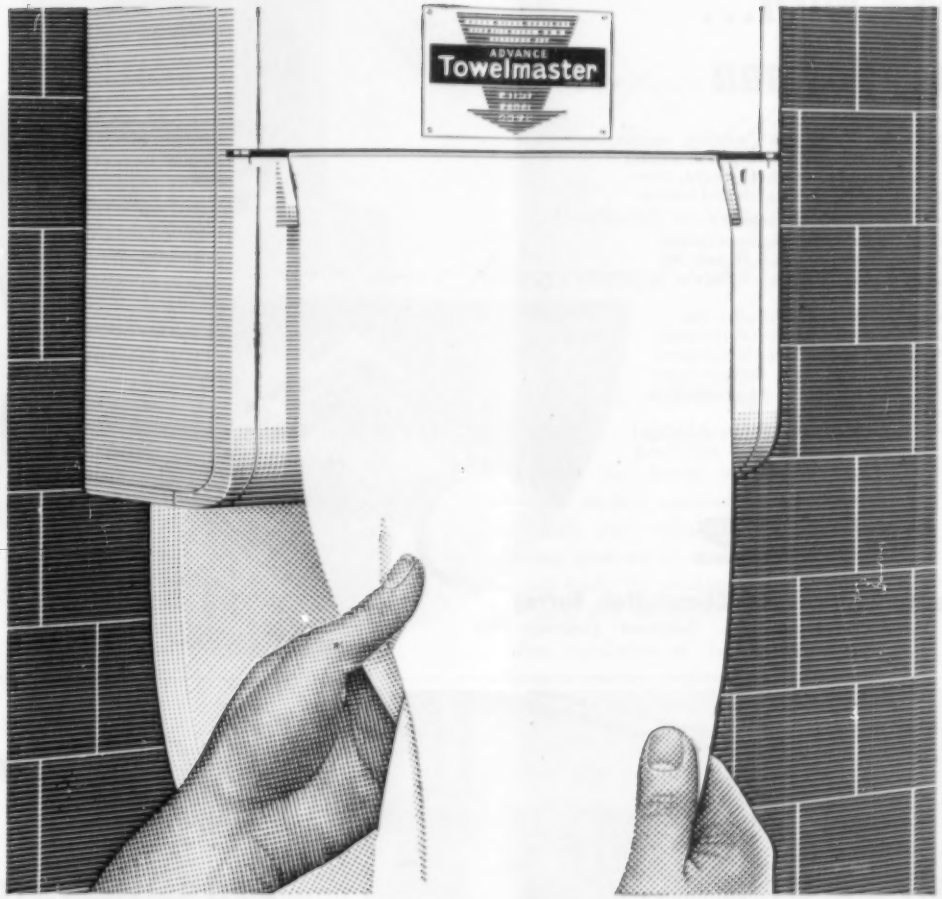

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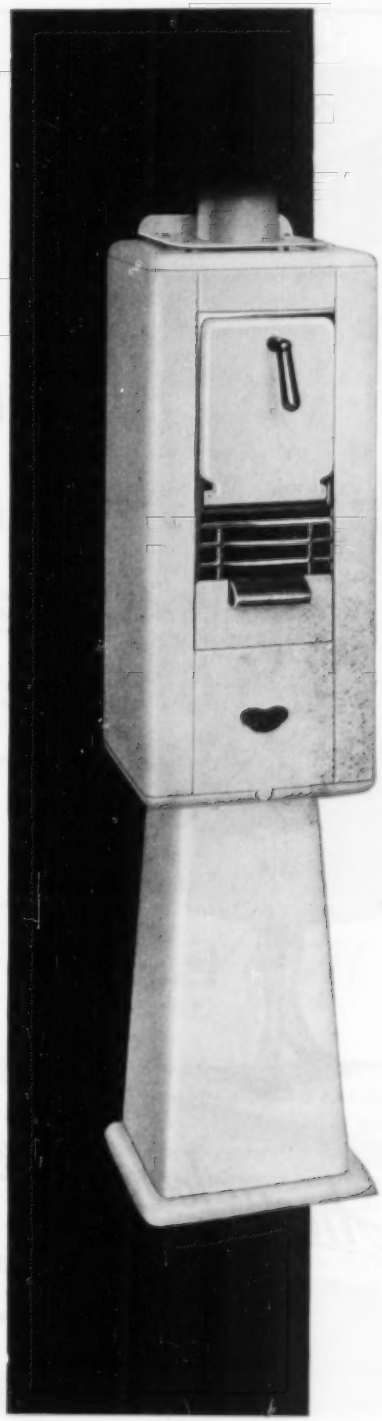

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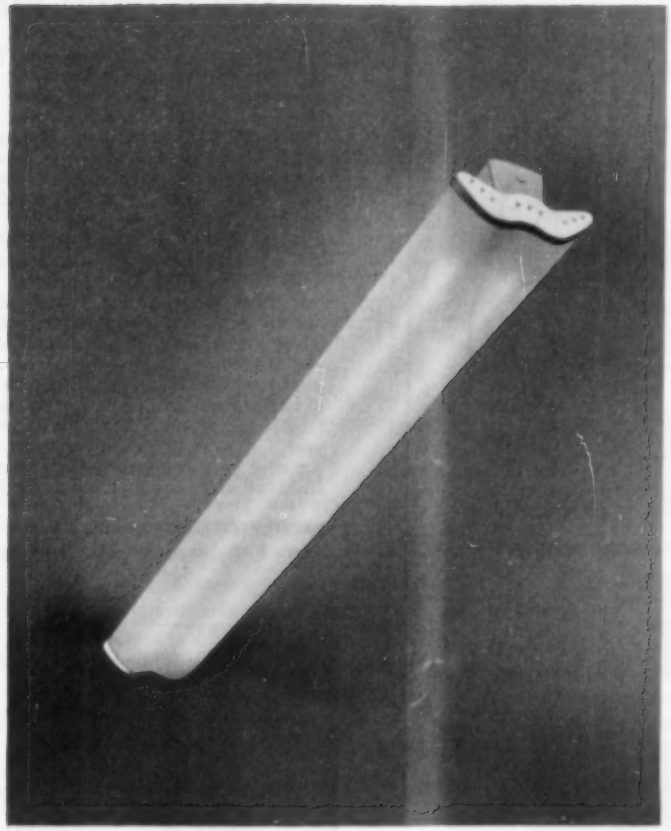

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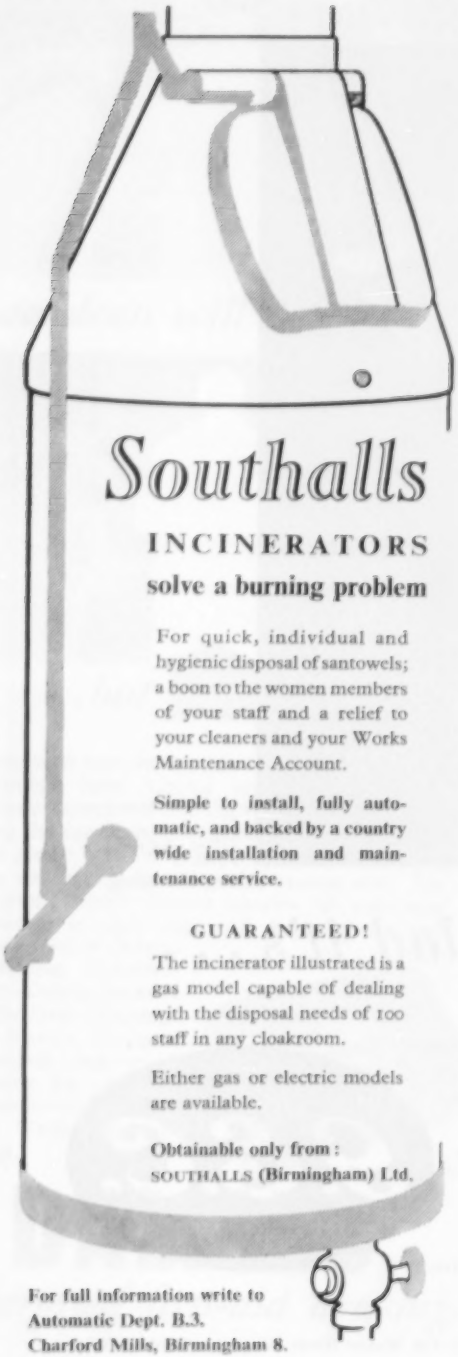

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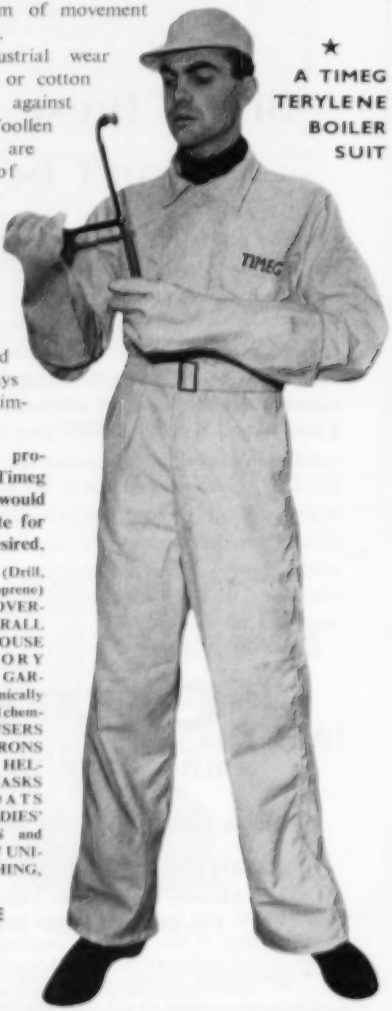

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Special Safety Issue

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The High Price of Accidents

SIX TIMES THE COST OF STRIKES

FOR many years new ideas and methods of accident prevention have been a prominent feature of this journal. We have ranged from the psychology of accident proneness to the use of TV as a means of putting across safety propaganda, from the organising of safety exhibitions to the composition of accident prevention committees. We have covered such matters as safeguarding machinery and protection of the body and emphasised the tie-up between good housekeeping and safe working conditions. Currently, we are running a series of articles on the Factories Acts which set out the legal requirements in these matters. And of course there are our pages on New Industrial Equipment that give details of the new safety products that regularly come on to the market.

In producing this *Special Safety Issue* we have made no attempt to round up the past however briefly. It is intended rather as a means of putting before personnel managers and safety officers news of such new methods, ideas and products as have come to our notice in recent months. The basis of most successful accident prevention campaigns undoubtedly lies in an obstinate refusal to neglect the dull routine chores of risk elimination; even so, from the practical as well as the editorial standpoint, there is always something new in safety.

In recent months the very serious and vexed issue of redundancy in the British motor industry has overshadowed every other industrial topic. It would be idle to pretend that physical injury on the shop floor is likely to capture the public imagination to the same extent, but it is well to remember that while redundancy may cost a livelihood an injury may cost a life. *And in actual figures accidents are causing a loss of production six times that caused by strikes.* Totals for 1955 showed that last year we lost 3¾ million man-days through strikes and disputes whereas nearly 20 million man-days were lost through accidents. It is a toll of blood and treasure much of which industry need never pay.

GRIM REMINDER! Belgium's Prime Minister, M. Van Acker, anxiously questions a rescue worker at the scene of the Marcinelle pit disaster last month. A wagon apparently brushes against a cable and the resultant sparks cause a fire that takes the lives of 270 men. The most tragic accidents so often spring from simple causes.

It is true, as the Minister of Labour and National Service said earlier this year, that "safety is everyone's business". But it is also true that it is the special concern of the personnel manager and safety officer. In the large firm co-operation between the two definitely gets results, while in the small firm the personnel manager often has to combine both functions. In firms both large and small we may have to make a special effort this winter to regain some of the ground lost to competitors in export markets, and this could well mean more risk-taking on the shop floor. If, without crying havoc, this issue succeeds in throwing into sharper relief the need for unremitting care, it will have served its purpose. Without awareness, there can be no action.

THE EDITOR

The Safe Use of Radioisotopes In Industry

Here is a specially written account of the measures that should be taken to control a new but dangerous material—radioactive isotopes—whose use in industry and medicine is growing rapidly. The article deals with the three distinct forms of radiation emitted by radioactive substances: alpha particles, beta particles and gamma rays. Their ability to penetrate the body varies greatly, so the general precautions for each are fully described.

By R. J. SHERWOOD,
Health Physics Division,
Harwell Atomic Energy Research Establishment

RADIATION has been a part of the human environment for as long as mankind has existed, its natural sources being found in cosmic rays and in the radioactive substances that are present in the earth. Those radiations that are commonly used in industry are all to be found in small amounts in nature; it is only the sources of the radiations that are frequently man made.

Although radioactivity has always been present it was not recognised until 1896, at about the time when radium was first isolated and when X-rays were first being studied. It was following the use of the new discoveries in the diagnosis of bone-fractures and in skin and cancer therapy that ill-effects caused by heavy doses were first observed. The advent of the first World War saw the introduction of the first industrial use of radioactive material in the manufacture of luminous instrument dials; for this purpose small amounts of radium were mixed with fluorescent material to make it visible at night. Unfortunately the risk associated with the introduction of radium into the human body was not recognised at the time and it was only when symptoms of bone diseases appeared in those engaged on the work that the dangers became apparent. The years after the first World War saw the introduction of X-ray machines into industry for the non-destructive examination of pressure vessels, and by the second World War considerable experience in the safe use of radium and X-ray machines in industry had been gained.

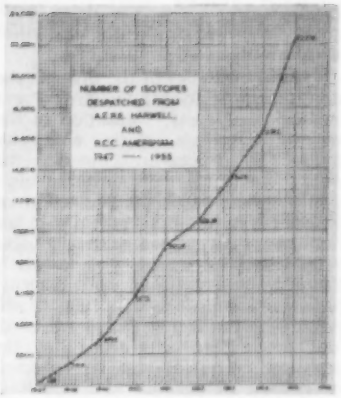
In 1919, Rutherford first produced an artificial radioactive isotope (oxygen^{14}) by bombarding nitrogen with alpha particles. In 1930, Cockcroft and Walton produced similar transmutations by means of protons accelerated in high energy machines. The production of radioisotopes would have remained an extremely costly business, and it would not have been possible to produce them in anything but the smallest quantities had not the fission process been discovered in 1939. As the surplus neutrons produced from fission can be used to convert naturally occurring stable substances into radioactive forms, the large scale use of the process in reactors or "piles" has made possible the production of radioactive materials in adequate quantities and at a comparatively cheap price. The reactors to be constructed under the nuclear power programme as well as generating electrical power will ensure that there is no shortage in the supply of radioactive substances in the future.

The use of radioactive isotopes in medicine and industry has increased extremely rapidly in recent years. Figure 1 shows just how rapidly shipments of radioisotopes from Harwell and Radiochemical Centre, Amersham, have increased and points to the need for a correspondingly rapid spread of information on safe methods of handling. This is being undertaken by the Factory Inspectorate and by the Radiological Protection Service, the latter being set up by the Medical Research Council and the Ministry of Health specially for the purpose. To encourage the safe use of radioisotopes, Radiological Protection Courses of one week's duration are now being held periodically at Harwell. They are intended for industrial users of isotopes and are supplementary to the regular monthly courses on isotope applications and handling techniques.

Maximum Permissible Levels

Whereas the natural radioactivity which has always been present in small amounts, causing a dose to each individual of about 0.1 roentgen per

Waste solutions containing fission products are shipped to the Radiochemical Centre at Amersham for refining. Here an operator fully clothed for the job is removing the outer steel lid from the transit container. The vessel is of lead, 4 in. thick, and steel, 3 in. thick. It carries about 4 gallons of radioactive solution.



This chart tells its own tale of a valuable and rapidly increasing but hazardous traffic (Figure 1).

year, apparently produces no ill-effects, the heavy doses received by early industrial and research workers and by radiologists were found to harm the human body. It therefore became necessary at an early date to establish levels at which no deleterious effects would occur in a person's lifetime; these were first suggested in this country in 1915. Safe levels are now the subject of recommendations made by the International Commission on Radiological Protection.

The Commission sets the maximum permissible level for continuous occupational exposure to external radiation at the basic level of 0.3 roentgens per week and the maximum amount of radium retained in the body at 0.1 micrograms. From the basic level for external radiation, various operational levels are recommended, depending on the nature of the radiation and on the exposure concerned. From the permissible body burden of radium, limits have been derived for other active materials in the body, and, from these, permissible concentrations in air and drinking water are set.

The recent Medical Research Council report "The Hazards to Man of Nuclear and Allied Radiations" (Cmd. 9780, H.M.S.O. 1956), whilst retaining the weekly maximum level, fixes the cumulative dose that may be received by the gonads of an individual before the age of thirty to 50r and the lifetime dose to 200r.

From this outline of permissible doses of radiation it is apparent that radioactivity presents two rather different types of hazards, depending on whether the material is inside or outside the human body, and it thus calls for two different types of control measure. The hazard associated with either of these depends in part on the form of radiation emitted by the radioactive isotope in question—each radioisotope emitting one or more types of radiation.

The Forms of Radiation

There are, in fact, three distinct forms of radiation emitted by radioactive substances and these are known as alpha particles, beta particles, and gamma rays. While all of them share the property of producing ionisation in the material through which they pass, their ability to penetrate matter varies greatly.

Alpha particles are the nuclei of helium atoms and have a very short range, so that if the source is outside the body it does not normally constitute a health risk as the particles are stopped by the layer of dead tissue on the surface of the skin. However, if alpha particles are emitted from material inside the body, a very real hazard can be created as, owing to their short range and high energy, alpha particles cause intense ionisation in the immediate vicinity of the material.

Beta particles are electrons which are ejected from the nuclei of atoms at high speeds and, as they have a longer range than alpha particles, they can penetrate the skin. The ionisation produced damages the tissue where the skin is formed and high doses of beta particles lead to burns, dermatitis, and possibly eventual cancer of the skin. Beta particles can also constitute a hazard to the unprotected eyes, leading to the increased risk of cataract formation. Like alpha emitters, beta emitting isotopes can be a serious health hazard if retained in the body.

The third type, gamma rays, are a form of electromagnetic radiation. The rays have a long range and normally create a risk to the whole body, with the hazard usually arising from sources outside the body.

To appreciate the principles of controlling the safe handling of radioactive materials, the essential difference between these three types of radiation and the fact that the hazard may arise from sources outside or inside the human body must be realised.

Control of External Radiation

External radiation is controlled by the application of one or more of three main aids. These are: distance, shielding, and time limitation. As the strength of all radiations falls off rapidly with increasing distance from a radioactive source, safety may be achieved by manipulating radioisotopes at a distance from the body. It is a very good rule never to handle any radioactive material with bare hands or even gloves, but always to use forceps or remote handling tools. With larger sources it becomes inconvenient to carry out manipulations at the greater distances necessary, so it is customary to interpose shielding between the source and the operator. For beta emitting substances, glass and perspex usually suffice, the thickness of ordinary laboratory glassware often being sufficient to reduce the radiation to a safe level. For gamma emitters it is usually necessary to turn to steel, lead, or concrete. Restriction of the time worked can also be an important factor in controlling the external radiation risk. Although the permissible dose is limited to 0.3 roentgens per week, there is no restriction on how rapidly this may be received. For example, a person may receive radiation at a rate one hundred times that permitted for continuous occupational exposure, so long as this working

A source of beta-gamma radiation in a small aluminium can has been removed from the lead container in which it was brought to the airport and is being loaded into a wing-tip recess. Passengers and crew are protected by the distance between them and the source; the loader relies partly on distance and partly on the short period of his exposure.

time is restricted to one hundredth of the normal working week, or roughly half an hour. A corollary follows in that if advantage is taken of this great care must be taken in planning the operation, as any fault that caused a hold up in the work might have the most embarrassing consequences.

Control of Radioactive Contamination

The prevention of the internal radiation hazard is more complex as the source of hazard is frequently not obvious, and the amount of activity concerned usually very small. Control is based on preventing or limiting the radioactive contamination of the air and the surfaces around the source. The reason for this is that so long as elementary though strict precautions are taken to prevent any active material getting into the mouth, the greatest hazard arises from breathing radioactive materials into the lungs. If this material is in the form of a dust, mist, or vapour, it may be retained in the lungs and gradually accumulate there or elsewhere in the body, particularly in the bone; so long as the air is clean this cannot happen. To ensure safe conditions the manipulation of radioactive material is usually carried out in fume cupboards or in sealed boxes. Handling operations in boxes are carried out by means of rubber gauntlets sealed on to the face of the box.

Wherever open (unsealed) sources of radiation are handled, contamination of the surroundings is likely to occur and two fundamental principles are applied to control it: cleanliness and containment. Thus, by confining the active material to fume cupboards or sealed boxes, and by frequent cleaning of the laboratory and surrounding areas, the contamination is prevented from building up to dangerous levels and from spreading through the building. Control is obviously simplified if the building is initially designed for handling radioactive material.

As with the external radiation hazard, the necessary precautions will depend on the nature of the emission as well as on the size, and in this case mobility, of the source. Additional factors affecting the toxicity of the material are its rate of decay and its behaviour in the body. All radioactive materials lose their activity with time and to determine the rate of this decay the time taken for activity to drop to one half its initial value is measured. This may take a fraction of a second or more than a million years, depending on the isotope. The variability in half-life of isotopes and the differences in their behaviour in the body create a wide range of permissible concentrations—for example, the permissible concentration of carbon^{14} in air is 5 million times as high as that of plutonium^{239}.

Industrial Applications

The applications of radioactive materials in industry are many and various, and it is not the purpose of this paper to describe them all or to detail the particular precautions necessary for each.

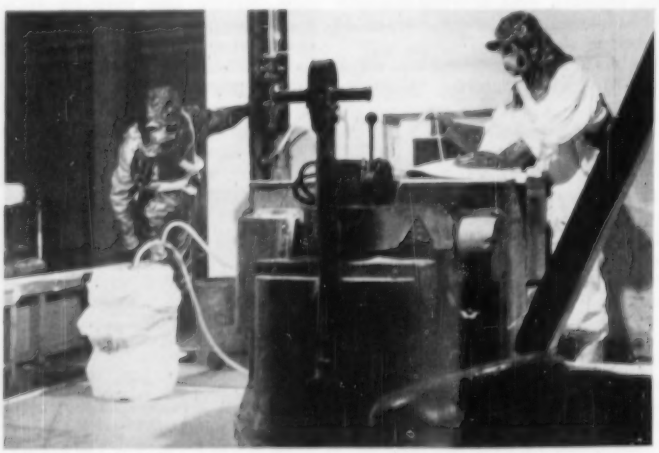
The properties of radiation which are of value to industry are three in number. They are that radiation affects material, that radiation penetrates material, and that radiation identifies material.

Typical examples of the first are the sterilisation of foodstuffs, drugs, and medical equipment; ionisation of the air to eliminate static electricity created in process machinery; the creation of initial ionisation in electronic tubes; and the excitation of phosphors in luminous paints. In the first two applications sealed sources of radiation are used, and normally the only hazard arises from external radiation, the amount of which will depend on the size of the source used, and the nature and energy of the emission. Control can be achieved by the use of distance and shielding, and by the limitation of the exposure time. The latter two applications require the use of open sources; in the case of electronic tubes no direct handling of the active material is necessary and fairly simple control methods are adequate; luminous dial painting on the other hand, requiring the manipulation of loose radium salts, has had a most unhappy history owing to the early lack of knowledge of proper control procedures. To-day the work is carried out safely under the stringent provisions of the Luminising Regulations (1947).

The ability to penetrate material is employed in industrial radiography; in gauging the thickness of materials, and in the checking of the contents of packages. In all these applications closed sources are used and hazards relate to external radiation only. Shielding, distance, and time limitation can all be called upon to contribute to protection.

The third property, that of radiation being able to identify and thereby trace material, is evident in the increasingly general use of radioactive tracers in experimental and process applications. By their use it is possible to follow the track of a particular component in a complicated process, for example, the mixing of small quantities of mineral salts into animal foodstuffs can be investigated by adding a tracer to the salts, and later checking the radioactivity in the final product. Health precautions in this application include the choice of a radioactive substance that decays (loses its activity) rapidly and that is of low toxicity. There are very many applications of tracer technique already in use, and many more are bound to follow. The direct radiation hazard associated with tracer

(Continued on page 166)



During much of the separation process the material which has been irradiated in the pile is in liquid form and radioactive. Men who deal with this have to wear protective clothing which in this case is made of plastic.

The HOW and WHY of ACCIDENT INVESTIGATION

by H. R. HALL

The main reason for the thorough investigation of accidents, stresses the author, is not to fix the blame on someone but to prevent a similar accident happening again. Investigations should be recorded by some standard method and the results acted upon. A most important point is to question witnesses as soon as possible after the incident but to let them tell their stories with the minimum of prompting.

SOME mistakes made in industry lead to higher costs, loss of production and waste of materials. The incentive to correct and the responsibility for the correction of these mistakes are usually well understood and directly related to the main purpose and design of an organisation.

Other mistakes lead to accidents which injure people. Such comments as "Carelessness", "Doesn't know his job", and "It's a human failure and you can't change human nature", frequently made by executives who are obviously not irresponsible people, indicate that the incentives are not known, the responsibility for correction not clearly defined. Even where these are clear, sound methods of investigation are often not very well established.

Incentives

Accidents arise when mistakes lead to the adoption of dangerous methods of work, or a dangerous working environment, and in 1938 Lord Maugham described the employers' Common Law responsibilities as follow:—

"In Wilsons and Clyde Coal Co. v. English (1938), Lord Maugham said:

"In the case of employments involving risk . . . it was held that there was a duty on the employer to take reasonable care, and to use reasonable skill; first, to provide and maintain proper machinery, plant, appliances, and works; secondly, to select properly skilled persons to manage and superintend the business; and, thirdly, to provide a proper system of working."

In 1947, L. J. Scott added to this statement by including the idea of enforcement, as follows:—

"In Vaughan v. Ropner & Co. Ltd. (1947) L. J. Scott said:

"The three main duties (of the employer) are (1) to provide proper premises in which, and proper plant and appliances by means of which, the workman's duty is to be performed; (2) to maintain premises, plant and apparatus in a proper condition; (3) to establish and enforce a proper system of working."

The economic incentive is fairly

Safety Decalogue

IF any industrial safety programme is to succeed, it is imperative that it should be regarded by all concerned almost as an article of faith. A useful step in this direction has been taken by the "Washington State Safety Advocate", with the publication of "ten commandments" for supervisors to teach them their responsibilities in accident prevention. The "Advocate" is the official paper of the Washington Department of Labour and Industries, and its "Ten Commandments for Safety" are as follows:—

1. *You are a supervisor and thus, in a sense, have two families. Care for your people at work as you would care for your people at home. Be sure each of your men understands and accepts his personal responsibility for safety.*
2. *Know the rules of safety that apply to the work you supervise. Never let it be said that one of your men was injured because you were not aware of the precautions required on his job.*
3. *Anticipate the risks that may arise from changes in equipment or methods. Make use of the expert safety advice that is available to help you guard against such new hazards.*
4. *Encourage your men to discuss with you the hazards of their work. No job should proceed where a question of safety remains unanswered.*
5. *Instruct your men to work safely, as you would guide and counsel your family at home—with persistence and patience.*
6. *Follow up your instructions consistently. See to it that workers make use of the safeguards provided them. If necessary, enforce safety rules by disciplinary action.*
7. *Set a good example. Demonstrate safety in your own work habits and personal conduct. Do not appear as a hypocrite in the eyes of your men.*
8. *Investigate and analyse every accident, however slight, that befalls any of your men. Where minor injuries go unheeded, crippling accidents may later strike.*
9. *Co-operate fully with those in the organisation who are actively concerned with employee safety. Their dedicated purpose is to keep your men fully able and on the job and to cut down the heavy personal toll of accidents.*
10. *Remember: not only does accident-prevention reduce human suffering and loss; from the practical viewpoint, it is no more than good business.*

well established. Examination of the history of accidents in this country roughly confirms the findings which H. W. Heinrich published in "Industrial Accident Prevention" (a leading American work), that mistakes are repeated some 300 times for each lost time injury. It is difficult to believe that these errors are made without costs to the producer! The humanitarian motive exists only if accident can be prevented.

What to Investigate

If the assessment of the number of mistakes per lost time injury is correct, it is obvious that each mistake which can be investigated offers a chance of preventing a future accident and in practice it is found valuable to investigate each known accident, regardless of the occurrence of injury.

What to search for

If injury has occurred then the cause of injury is the first thing to be determined. It is also the easiest to find. It can be generally described as an object, dangerous because of its shape or state of motion; a material, physically or chemically harmful to humans; or a force dangerous to humans.

Immediate Cause—Occasion

If no injury has occurred, or when its cause has been ascertained, investigation should be made into the immediate cause of the accident itself. As a rule this is reasonably clear in all those cases not involving a mistake in a physical act of the injured person, such as hitting the hand with a hammer, or letting an object slip from the fingers.

Basic Cause

Many different immediate causes of accidents, however, spring from single basic mistakes and the discovery of these mistakes makes an accident investigation of great value. Such mistakes can be classified into the three groups within the organisation which make them.

The most far reaching mistakes are those made by that section whose decisions affect everyone within an organisation—the senior management. The common law responsibilities defined above are normally delegated to senior management, and mistakes can be made originally, or a decision, correct in the first place, can become wrong by later changes in the raw material, the type of product or the type of employee. A machine, a training scheme, an instruction or a method of work designed to be effective in the great majority of cases originally, may become dangerous and the first symptom of the change may be an accident.

The next most serious mistakes are those made by supervision in carrying out correct decisions of senior management. These involve lack of understanding of the decisions, refusal to abide by them, or lack of ability to get them carried out.

The last group of mistakes are those made by individual workers which mainly affect the worker himself. They involve refusal to obey instructions, inability to understand them, or temporary or permanent lack of skill arising from a multitude of reasons.

The discovery of the basic cause of an accident does not complete investigation into causes. It is of vital interest to know whether the accident represents a result which may be repeated in similar circumstances, or whether it is the result of the personal idiosyncrasy of an individual acting on the circumstances. In the first case some alteration to the circumstances should be made! In the second, it may be that the individual should be moved. It appears probable that although an examination of the precise circumstances may help, the real answer is only available after a sufficient number of instances have produced reliable evidence one way or the other.

Methods

Evidence about an accident comes from witnesses, both animate and inanimate. The animate witnesses are the people who were in some way involved in or saw the occurrence. The inanimate witnesses are those objects or forces which must be observed and tested to secure their evidence. Broken chains, bared electrical conductors may have a vital story to tell.

The Story

People who saw what occurred should be asked to tell their story at the earliest possible moment before they have had time to "cook-up" a good one. With the best of intentions, given time, witnesses are sure to become involved in what they think should have occurred, instead of what they saw. I once had an accurate description of what a witness sitting at a table "saw" happening to two others although there was a nine

foot brick wall between him and the incident.

The witness saw the result—one man dead of electrocution, and one injured by being knocked down—and knowing what they were doing quite correctly imagined what must have occurred. A fused crowbar tip punctured high tension line, a blown fuse and a burned hand were the inanimate witnesses which confirmed the story.

In any case, eye witnesses should be encouraged to tell their stories of a happening with a minimum of prompting, until a correct description of the events from the start of the action which culminated in an accident is obtained. Questions should only be asked in order to fill in vital details.

Test the Facts

The story should be tested by re-enacting—either in fact or in imagination—to ensure that it is complete, and the parts not relevant to the investigator's needs discarded.

Conclusion

If the story is correct, the answers to the following questions will be found to spring from it:

What caused the injury ?
What was wrong with the method or environment ?
What mistake caused this ?
Where did the mistake originate ?
Who can correct this mistake ?

Corrective Measures

The measures which will prevent a recurrence of the accident will spring directly from the conclusions which have been drawn. It is part of an investigation to recommend these measures. Sometimes they may deal only with the cause of injury and the immediate cause of the accident, leaving consideration of the removal of the basic cause until further evidence has accumulated. This is reasonable as it stops the recurrence of the precise accident, and leaves the class of accident to which it belongs for later consideration.

Generally speaking, basic causes of the first group already mentioned are the easiest to deal with. When clear evidence to show that a mistake has been made is produced, the management group affected can reconsider a decision, alter it, and put the alteration into effect.

The second group involves the more complicated problem of changing other peoples' attitudes, and all the complications of re-training and propaganda common to such problems.

The third group are the most difficult of all to deal with, for although some of the reasons are amenable to the above measures, others involve the private life of the worker, and the solutions may be uneconomical.

Reporting

All investigations should be recorded in writing, either on a standard form, or by a standard method. As they should result in corrective action of some sort, it is advisable to recommend the action to management and let those affected by the action know the details. The superintendent of the area or shop concerned will probably have been consulted about the accident, and agreed the remedial measures, so should be kept informed. Others may have to take some action and the written recommendations can be used as an instruction to them.

Whatever the method of record, the following details should be included, so that it can be used both to deal with the accident by itself, and to combine it with others for statistical consideration. The order should be constant.

Accident Investigation Report

Identification of the accident:
(Severity. No. Place).

Identification of the injured:
(Name. Badge No. Dept. Method of Payment. Trade. Experience. Age. Marital State ?)

Identification of the injury:
(Medical description. Disability, either permanent or temporary).

Summary of report in one or two lines.

History of events up to moment of accident.

History of accident.

Conclusions, i.e.:
(*a*) Cause of injury.
(*b*) Occasion of accident.
(*c*) Basic cause of accident.
(*d*) Contributory causes of accident if any. (Breaches of Regulations).

Recommendations to remove (*a*), (*b*), (*c*) and (*d*) (including names or positions of those responsible for carrying out recommendations).

It should be noted that at no stage is there any suggestion of allocating blame for the occurrence of an accident. If the common law responsibility of the employer is intelligently accepted it is difficult to understand how blame can be allocated even by the employer—certainly it should not be by an investigator who would promptly dry up his sources of information.

It should also be noted that there is no suggestion of obtaining "Signed Statements" or legal evidence. Again, this is no part of the duty of a safety officer who is the normal person to investigate accidents. His value to his employers depends on his ability to offer advice which will lead to the reduction of accidents. Amongst other things, this depends on his ability to obtain a correct story of occurrences which in a prosecution may affect the result. Attempts to get signed statements effectively destroy the confidence which is the only reason for giving the story without reservations.

Six Points of Accident Investigation

1. ***Determine always whether the accident being investigated is one that is likely to be repeated.***
2. ***Question people who saw what happened as soon as possible after the occurrence.***
3. ***Witnesses should be encouraged to tell their story with the minimum of prompting; questions should only be asked to fill in vital details.***
4. ***The story should be re-enacted to ensure that it is complete.***
5. ***Investigations should be recorded in some standard way and should result in corrective action of some sort.***
6. ***It is not the investigator's job to allocate blame. He has to find out what happened and he should avoid any suggestion of "signed statements" or legal evidence.***

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TOTECTORS REG'D

Bridal car runs over Bridegroom's toes

FROM OUR OWN CORRESPONDENT

Sightseers at a wedding at Caxton Hall yesterday saw the bridal car drive up to the entrance to the Hall and run over the left foot of the bridegroom. The best man rushed to the assistance of the bridegroom who with a smile explained that he was wearing a pair of the very latest (*LIGHTWEIGHT*) *TOTECTORS*. The reception was held at the Grosvenor Hotel where our reporter made a close examination of the left shoe worn by the groom, he was amazed to find that such a smart shoe housed a steel safety cap. To those interested in safety we strongly advise that they write immediately to the sole makers of these new *LIGHTWEIGHT TOTECTORS*, WILKINS & DENTON LTD., 51-52 WOBURN PLACE, LONDON, W.C.1.

No. L113. The new black Oxford "Lightweight" Totectors Safety Shoe, welted construction, Dri-ped Chrome soles, Dunlop heel, vamp linings of "Protexa" fabric, specially treated to resist breakdown caused by moulds and other micro-organisms. Internal steel toecap.

(L243. *Full Brogue in tan with willow uppers, Sussex twin grip heel.*)

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Recent Advances in Dust Suppression

By W. B. LAWRIE, M.B.E.
H.M. Factory Inspectorate.

Dust creates a special hazard not only in the foundry but in most processing and extractive industries. Today, as a result of continuous research, much more is known about its suppression and control. In this article one of Britain's leading authorities on the subject describes the new methods that are now producing most encouraging results.

GREAT efforts have been made in the last decade to control dust in foundries, and while the developments that have resulted are immediately concerned with foundry practice, there is no doubt that the fundamental principles that have been elucidated are applicable to other industries. Original methods of dust control have been evolved, basic conceptions have been changed, and certain general conclusions have emerged from the work. One of the most important of these is that the subject is much wider than had been imagined, so that good dust suppression systems cannot necessarily be installed by a ventilating engineer working in isolation, but will often result only from the fullest co-operation between scientists, technologists, process experts and the design engineers who are responsible for the plant.

In the founding industry this close co-operation between men of greatly differing professional qualifications has resulted in marked advances in the suppression of dust. This new outlook is reflected in the terminology which is now in use in the industry where the phrase "dust suppression" is commonly employed to include every method by which atmospheric dust concentrations can be removed from the breathing zone of the operators. These methods fall into three broad groups.

1. The elimination of the dust.
2. The elimination of the dangerous fraction of the dust.
3. The control of the dust.

Elimination

The complete elimination of dust should always be the primary object because there can be no doubt that the best way of dealing with an objectionable dust cloud is simply to stop making it. There can be no doubt either that this is probably the most difficult way of dealing with a dust cloud, because attempts to eliminate dust will almost certainly involve research work, will mean that preconceived notions must be radically modified and may well lead to changes in the process. Wherever it can be achieved, however, it represents a complete and final solution to the problem, and for this reason a good deal of thought is being given to the elimination of dust in foundries.

Dust in foundry dressing shops results from the fact that the castings from the foundry carry adherent sand and other excrescences which have to be removed by dressing processes. Quite clearly, castings with a better surface finish would require less dressing, so that one way of eliminating dust in a dressing shop is to improve the castings coming from the foundry. A somewhat different approach has given a large measure of success in certain cases. The cavities in castings are formed by the use of sand cores, so that when a casting comes to the dressing shop, the internal cavities are normally full of sand which has to be removed. The process of removing this sand is known as decoring. An ordinary hand bar has now been fitted with a collar which carries four nozzles so arranged that they will deliver a water spray in the form of a cone around and along the bar. This spray projects beyond the point of the bar so that when it is in use the water wets the sand before the bar disturbs it. In consequence, no dust is made, and so the method represents a dust elimination technique, and not a control method.

A very clear distinction should be made here between the use of water to eliminate dust and the use of water to control it. Any process which can be done wet or in suspension will be dust free because the water will eliminate the dust. On the other hand, the use of water in the form of a spray to control dust clouds which have been allowed to become airborne is a dust control method, and in point of fact has never been found to be completely successful.

Dangerous Fractions

Most industrial dust clouds consist of a mixture of substances, some of which may be specifically dangerous to health. Even when the total cloud cannot be eliminated, therefore, the second step in dust suppression is to eliminate the dangerous fraction of the cloud. One example of the use of this method is contained in the Regulations which now prohibit the use of silica flour as a parting powder. The use of parting powders frequently results in very heavy airborne dust clouds, and silica flour is known to be dangerous to health. The use of other materials does not diminish the concentration of the resultant dust clouds, but the elimination of silica flour does ensure that the dust cloud is by no means as dangerous. Another example of this method of dealing with dust clouds can be found in the Regulations which prohibit the use of free silica as an abrasive in certain blasting operations.

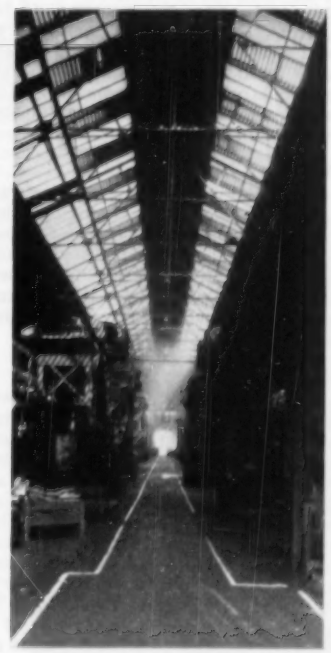
When the atmospheric dust clouds have been reduced as far as possible by the positive techniques of dust elimination, the residual clouds will have to be

controlled, and it is perfectly clear that the control methods will continue to serve over a wide field and for a long time. These methods include the use of water, respirators, local exhaust ventilating systems and general ventilating equipment.

Dust Control

Many attempts have been made to use water to control dust as opposed to the use of water for dust elimination, but none has yet proved completely satisfactory. Even water at high pressure has not been fully successful, and a recent publication includes photographs which show dust escaping through water at 85 lb. per square inch pressure.

Respirators should probably be looked upon as a last resort. There are, of course, circumstances in which the use of a respirator is a legal obligation, and in these cases, in foundries, either a Mark IV or a Microfilter must be used as these have been approved under the Regulations by the Chief Inspector of Factories. Nevertheless, every effort should always be made to apply the dust control techniques to the machine or to the process, and personal protection should only be used where this cannot be done.



General ventilation, as shown here in the roof, plays an important part in dust control. But it should be remembered that it scavenges dust and fumes *after* these have passed through local breathing zones. Local exhaust ventilation systems are therefore also necessary.

Ventilating methods may include the use of general ventilation as well as local exhaust ventilation, and when this is the case, the best results will only be obtained when it is clearly recognised that these two methods form complementary parts of a single ventilating system. The integration of a local exhaust ventilating system into an existing general ventilating system is never easy, but it should always be done so far as possible, and in new systems the local exhaust part should be designed first so that the dust is controlled at its point of origin. The general part of the system can then be designed to absorb the dust which has escaped the local units.

General ventilation alone should never be relied upon to scavenge an atmosphere because, even if it does so, it still only removes the dust and fumes from the building after they have been taken through the breathing zone of the occupants. Local exhaust ventilating systems should be designed on dust flow and not air flow. This would seem to be axiomatic as the systems are supposed to collect dust and not air. Unfortunately, it had not often been done until the results of recent research work made it easily practicable, but it has formed the basis of most of the developments in the founding industry.

Measuring Dust

The atmospheric dust which has to be brought under control consists of a variety of size ranges, and while general conditions demand the control of all sizes, protection against health hazards is mainly concerned with the particles which are less than 10 microns.* These small particles are invisible in ordinary lighting conditions, and can only be sampled by means of suitable instruments. When the samples have been taken, the microscopical counting methods demand skilled operators, and are so slow that one man can do no more than about five samples a day. This, of course, precluded any possibility of routine work on a large scale, and it was for this reason that one of the early foundry committees called for " some quick and simple method which would enable rough comparisons to be made between conditions in different foundries ".

It was clear from the outset that the real loss of time occurred in the counting process, and it was also evident that in foundries where the dust concentrations were fairly high, efficient local exhaust ventilation devices might be expected to reduce it in relatively large steps so that no great accuracy of counting was needed. Obviously a system which did not, at any rate, halve the dust, might be said to have virtually failed. In consequence, a new estimation technique was developed by means of which the dust samples could be estimated against a scale, and this new development increased the speed of estimation to about fifty samples an hour. The method was adapted for use in foundries, and, after some preliminary work, the Owens Jet Counter was used as the sampling instrument for a general survey of part of the industry.

The method has now been widely used in foundries both to estimate general dust levels and to check progress on particular dust control systems during the development stages. Further work is still in hand in an effort to get a quick and simple device for dust sampling, and one of the latest suggestions is for a continuous instrument which would give samples that could be assessed in a nephelometer.

The use of the rapid estimation techniques produced some rather disturbing results, one of which was that the provision of local exhaust ventilation for certain grinding machines had not reduced the average dust concentrations at the breathing level of the operator. It has already been indicated that the dust clouds are invisible in ordinary lighting conditions, and at this stage of the work, it was decided that the anomalous results which had accrued could probably be most easily elucidated if the dust clouds could be seen. In consequence, a new method was developed by means of which dust within the respirable size range could be both seen and photographed on a 35 millimetre cinematograph film. Figures 1 and 2 (overleaf) illustrate the results that have been obtained by this method which has now been used extensively in the development of new methods of local exhaust ventilation for foundries.

The large amount of work that has been devoted to the examination of local exhaust ventilating systems for foundries has resulted in many new developments. In the first instance, a

* 1 micron = $\frac{1}{1000}$ millimetre = $\frac{1}{25000}$ inch.

dressing bench was designed in which a positive air curtain assisted the exhaust system, and this method has also been used in knock-out ventilation. An external system was developed for pedestal grinders in which the dust which left the wheel hood was collected by relatively fast moving air streams, and other work gave further information about the more conventional method and included a new design of roller work rest.

The swing frame grinder was fitted with a hollow boom so that the dust control system would be integral with the machine, and certain modifications have now given a high standard of dust control. This work on the swing frame grinder was the first attempt to fit the local exhaust ventilating system to a movable machine. The next step in the work was to develop some integral system which would be suitable for fully portable machines, such as pneumatic chisels, and this led to the development of a completely new ventilating system which has become known as the low volume high velocity system.

Local Exhausts

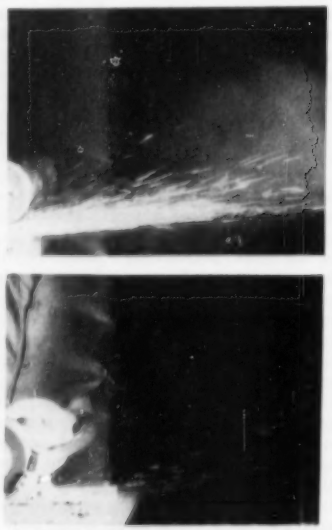
Conventional local exhaust systems use large volumes of air moving at low velocity, and, in consequence, need ducts of large diameter which are both too heavy and too cumbersome to be attached to portable tools. The use of low volumes of air moving at high velocity under high vacua represented a completely new approach to the problem. The system was first developed for percussive rock drills in which the dust produced by drilling was extracted through a hollow drill steel to pass through the rock drill itself at a velocity of 16,000—18,000 feet per minute. The vacuum was obtained from an annular air ejector designed to give a static vacuum of 13-15 inches of mercury and a running vacuum of 10 inches of mercury. A series of research and development projects was then instigated to apply the system to a variety of foundry tools and processes, and it has now been shown that a high standard of dust control can be achieved in laboratory conditions with a vacuum not exceeding 5 inches of mercury. The vacua that have been used vary from 1 inch to 5 inches of mercury, the volumes range from about 6 cubic feet to about 250 cubic feet of free air per minute, and the duct diameters vary from about $\frac{1}{4}$ inch to about 3 inches. In general, the portable tools use about $\frac{3}{8}$-inch diameter polythene hose, which offers little or no impediment to the operator, with air volumes of about 25-50 cubic feet of free air per minute. The system has now been applied to the following machines and processes.

The Pneumatic Chisel.

Early work showed that the dust could be extracted through a duct held over the operator's hand, or through a hollow chisel, while later experiments have resulted in the construction of a rubber sleeve which fits over the chisel and which carries the ducts. Where large quantities of dust have to be handled, a conical extension duct, which is also made of rubber, can be fitted over the sleeve. The dust is removed through a $\frac{3}{8}$ inch diameter polythene hose at a vacuum of 5 inches of mercury when the system will extract about 6.5 cubic feet of free air per minute.

The Portable Grinder

The system was originally applied to a portable grinder through ports in the inner surface of a peripheral duct which was contained within the wheel guard. The guard on which the system was developed covered a large proportion of the wheel face, and would, therefore, be impracticable on certain work. In consequence, an extractor head was developed so that the maximum amount of wheel face could be exposed for grinding. The head can be seen in Figures 1 and 2, which also indicate the measure of dust control that has been achieved in laboratory conditions when extracting 40 cubic feet of free air per minute at a vacuum head of 5 inches of mercury through a $\frac{3}{8}$ inch polythene hose.



In Figure 1 (top) picture shows effect of grinding grey iron without exhaust ventilation. Figure 2 shows improvement with extractor head fitted. (*Pictures, courtesy Foundry Trades Journal.*)

The Portable Surface Grinder

Dust control was first achieved by the extraction of the ventilating air through ports in a ring that completely encircled the wheel. It was shown later that part of this ring could be cut away to allow the operator more flexibility in the use of the machine. The modified system extracted 33 cubic feet of free air per minute at a vacuum head of 5 inches of mercury.

The Bench Grinder

A high standard of dust control has been attained in laboratory conditions on an 8-inch diameter bench grinder, running at a free speed of 4,500 revolutions per minute with a peripheral speed of 9,000 feet per minute. The dust control system extracted 45-50 cubic feet of free air per minute at a vacuum of 3 inches of mercury through ports fitted with aerofoil vanes and mounted on the inner surface of a peripheral duct contained within the wheel guard.

The Swing Frame Grinder

A normal swing frame grinder was fitted with a peripheral duct in the guard through which about 250 cubic feet of free air per minute were extracted at a vacuum head of 3 inches of mercury through a 3-inch diameter hose. The system gave good dust control in laboratory conditions.

Fume Control

Preliminary experiments have shown that fume from a crucible containing molten magnesium can be extracted through a ring provided with inlet ports on the inner surface, so spaced as to give an average air intake velocity of 6,000-7,000 feet per minute. The system extracted about 160 cubic feet of free air per minute at a running vacuum of just over 1 inch of mercury. A smaller ring, extracting about 70 cubic feet of free air per minute at a running vacuum of about 1 inch of mercury, served to control the fumes from the runner bush of a mould when magnesium was being cast.

Acknowledgments. The Author is indebted to Sir George Barnett, H.M. Chief Inspector of Factories, for permission to publish this paper.

Management News & Ideas

Morale Boosters

AS a morale booster to their employees, as well as an effective publicity medium, *George Ellison Ltd.*, of Perry Barr, Birmingham, have installed a "shop window" on their premises, in conjunction with their associate companies, *Tufnol Ltd.* and *Alfred Ellison Ltd.*, where they display pictorial details of the firm's recent achievements.

The firm manufactures electric switchgear, and their shop window, situated where it is easily seen by public and employees alike, always has a topical flavour, as, for instance, when it illustrated the Russian Trade Delegation's visit to the companies' stand at the B.I.F. in London.

The shop window is also a useful place for displaying a list of situations vacant, since the theme is always that the firm is one to be proud of, and it has proved an asset in support of Press advertising for the recruitment of staff.

As another incentive to the loyalty of their younger employees the firm have instituted a National Service Benefits scheme, by which a sum of money is invested on the employee's behalf in National Savings Certificates every month during his period of National Service.

Every employee who has been with the group at least a year qualifies for this benefit at the basic rate of £1 per month, but a higher rate is invested for those who have obtained an Ordinary or Higher National Certificate, or their equivalents, and for those attaining non-commisioned rank or higher, as an incentive to promotion during service.

WINNING FRIENDS AND INFLUENCING PEOPLE

AMONG the latest of the many training techniques to venture upon our industrial scene is the Dale Carnegie Course In Effective Speaking and Personality Development. Many readers will at one connect this—and they will be right—with the Dale Carnegie whose book, *How To Win Friends And Influence People*, has to date sold some 5 million copies, a sale second only to the Bible among non-fiction works.

The course has been launched in Britain with much of the éclat and salesmanship one associates with a go-getting American concern. Advertisement literature asks employers what they would give for a magic wand to wave over personnel and thereby double their enthusiasm, increase their confidence and make them more effective. Employees are asked what they would be willing to pay for a magic wand to double their value to the firm and make them more successful, more influential and more able to accept responsibility.

Recently the Dale Carnegie organisation over here staged a Press Demonstration in London. About a dozen members of the inaugural course gave brief speeches on what the course had done for them. They included a research engineer, a fashion model, a budding politician and a training officer in industry. Without exception all claimed that it had at least given them increased confidence; some claimed in fact that it had rescued them from complete failure, breakdown or from the toils of a crippling shyness.

There could be no questioning the sincerity of the speakers. The course itself, however, seems to be simply a "practical" of the advice contained in *How To Win Friends And Influence People* which by implication tells its readers to be all things to all men. Whether this can be achieved without the price of being nothing to oneself is open to doubt. Yet there can be no doubt that the course seems to do something for those who take it.

Piece-Work Typists

A SYSTEM of payment-by-results in the typing pool of *The Carborundum Co. Ltd.*, Trafford Park, Manchester, has put the typists—and the company—in a unique position. Nine girls and two juniors are doing half as much work again as was done formerly by 19; they are earning exceptionally high wages; and they are continually asking the company to give them more work. Each typist working the system is saving the company a considerable sum of money and freeing equipment and space for other employees. Instead of waiting a day or more for their dictated letters to be transcribed, letter-writers now get them back within an hour.

The system—which involves the use of remote-dictation equipment—was introduced in 1955, following the general principle of the incentives scheme which had been applied in the works. Shop-floor workers were expected to produce a standard rate of work per hour, and when this rate was exceeded they were paid at 25 per cent higher rates for each extra unit of production. As a result over-all production had increased by 35 per cent per man hour, the cost per unit had dropped by 10 to 15 per cent, and the workers' pay had increased by 20 to 25 per cent. No unrest had been caused because the workers, as a result of being given in advance ample verbal and written explanations, were able to understand the system and soon realised that they were taking home more money. **(Business.)**

BEWARE OF THE RADIUM

The safe use of radioisotopes in industry is dealt with in a feature on another page. Radium needles, however, still play a very important part in the treatment of cancer and several thousand are made each year at the Radiochemical Centre, Amersham. Our picture shows an operator loading radium salt into a platinum needle. The work is done in hermetically sealed boxes.

Beautifully Told

AN outstanding example of the many beautiful publications now being produced by industry is that marking the centenary of *The Morgan Crucible Company Ltd.*, of Battersea, and (subsequently) many parts of the globe. Under the title *Battersea Works* the book gives an

account of the founding and growth of the company during the past 100 years. The typography is first class, the illustrations have extracted all of possible interest for the layman in the matter of crucibles and the story is as fascinating as any well-written biography. A wise use of colour sets the seal of excellence.

Argument still goes on as to whether publications of this nature impress employees as much as they do customers and others outside the factory. In the case of *Battersea Works* it is difficult to imagine even the most cynical employee failing to be impressed; in the case of others a positive pride is most likely to be the reaction. The formula, then, would appear to be: tell your story simply and don't gloss over the harder facts, don't be afraid of laughing at yourself if need be, and don't spare the expense when it comes to the printing. After all, it's only once in 25, 50 or 100 years.

A Model Employer

A high level of amity and confidence existing between union and management is recorded at the *Dowty Group* of factories in Cheltenham, where the shop stewards sought an interview with the management, not to announce a grievance, but to ask that the compliments of the employees should be given to Sir George Dowty, chairman of the *Group*, and if he would accept a new motor-car as an expression of their regard for him as a model employer.

In reply, Sir George declined the gift, asking instead that the money should go towards the establishment of a new club for old people at the former Cheltenham Boys' Home in St. Margaret's Road.

Emergency Operation

A RECENT issue of *TWI Topics* tells the story of how *Johnson Brothers (Dyers) Ltd.*, of Liverpool, solved a production problem.

In September, 1955, the firm, owing to an unprecedented number of orders, was three months behind normal schedule in one of its subsidiary trades, the recovering of eiderdowns. There was no room for new machines and no labour could be transferred from other sections.

Notices were therefore posted throughout the factory calling for adult female volunteers, either employees or their relatives, to take eiderdowns home and work on their domestic machines. The response was immediate and within two days 40 women had come forward to answer the appeal. The next problem was to train these volunteers in a skilled job in the shortest possible time.

TWI breakdowns had previously been made of every job in the department and they proved invaluable. From the breakdown sheets the firm made out instruction sheets and planned the training. Two groups of 20 women were given a 10-minute introductory talk after which a skilled operator demonstrated the job step by step and the learners followed each step on their instruction sheet. The whole instruction took 1¼ hours. After the instruction each woman took a job and an instruction sheet home with her and was told to bring the job back to the works when it was finished. They were, of course, also told the rates for the job. The firm had 2 per cent failures, 12 per cent required corrections and the remainder was top quality work. In the three months that followed, output of eiderdowns was doubled and the arrears of work cleared.

SAFETY ON SHOW

This group of apprentices is one of the increasing number of parties from industry now visiting the recently remodelled Industrial Health and Safety Centre, Horseferry Road, S.W.1. The Centre is run by the Factory Inspectorate.

Medal Winner

THE Bowie Medal, an award made annually to a member of the Institute of Industrial Administration for a noteworthy contribution to management development, has been presented this year to Mr. E. F. L. Brech, consultant, author and lecturer on management subjects.

The medal, instituted in 1954, commemorates the work carried out for the Institute by the late Dr. James Bowie, pioneer of management education in Britain.

Mr. Brech is a senior partner in *Urwick, Orr and Partners Ltd.*, and is a member of the I.I.A. Council as well as past chairman of the London Branch.

Joint Control Stays

A PROPOSAL to replace Mr. Ernest Bevin's principle of joint control by both sides of the dock industry by an organisation of employers alone has been rejected by the Committee of Inquiry appointed last year to look into the operation of the Dock Labour Scheme.

Reasons for this rejection are contained in the Committee's Report published recently as a Command Paper (No. 9813, 3s. 6d.). It regards it as unrealistic to talk of suspending the Scheme which, in its opinion, is now an essential part of the industry and is not less valuable to the employer than it is to the worker.

After eight years' working, says the Report, there is much to be put to the credit of the scheme and none of the grave unrest that has occurred can be put down to any of its provisions. But disappointment is expressed that the Board has not matured into a more positive force and has not made a greater contribution towards curing the malady in the industry.

Going Abroad?

TO those thousands of representatives of firms who are sent overseas every year on business it is an invaluable asset to know something of the country they are going to, and of the people living there. This kind of information is provided by Oversea Service, a new organisation for non-technical training of British citizens going overseas, especially for the first time.

The service provides courses on many of the regions to which representatives may be sent, with lectures by natives of, and experts on, those regions. Wherever possible, speakers are chosen to suit the students' particular grade and occupation.

Whilst the organisers do not claim that they can teach a student every single detail he may need to know about a particular country, nor is he expected to retain all he is told, yet, in the words of an employer who attended part of a course, "much or most of the knowledge will doubtless lie fallow until opportunity brings it forth to illuminate problems whose existence might otherwise . . . remain unperceived".

Inquiries for further particulars should be made to the Training Officers, Oversea Service, 2, Eaton Gate, London, S.W.1 (SLOane 9611), except for details of courses on India, Pakistan and Ceylon when the address is the General Secretary, Oversea Service, Moor Park College, Farnham, Surrey (Farnham 4878).

HOUSE MAGAZINE DIGEST . . .

Other Firms' News And Views

Personal Responsibility

ALTHOUGH the company has, as a matter of policy, laid down rules which must be conformed to in the interests of safe working and accident prevention on site, the ultimate success of such a policy is entirely dependent upon the attention given to the subject by individual employees. As far as common law is concerned, even though the Company may not be in breach of regulations, it has a common law liability to ensure that a safe system of work is provided for all employees. Consequently, if a man is injured in an accident on the site, even though the Company has complied with the regulations, under certain circumstances it is possible for heavy damages to be claimed as a result of a common law action. . . . Safe working is the responsibility of every member of the team on the Company's sites, and it is a responsibility which everyone is expected to live up to.

(Team Spirit: John Laing & Son Ltd.)

Our Newspaper

The *Remington Rand News* is your newspaper. Every month it brings you stories and information about Remington Rand—and the men and women who are employed within the organisation. It exists because management recognises that through such means employees can be kept informed about the company and its policies. Its main aims are these:

1. To draw individuals into closer contact with the company by showing them that they are something more than names on a payroll. By fostering that precious asset—esprit de corps—among employees it shows that they are part of a vital, important and active organisation which holds a leading position in its industry.
2. To provide employees with information about Remington Rand—its products, plans, new policies and methods of doing business. It's a fact that a fully informed employee is better qualified to speak for his company among his friends—both in and out of working hours.
3. To promote employee activities by featuring news stories on sports and social events and by keeping employees posted about the latest activities of the social clubs.
4. To encourage the Remington Rand Suggestion Scheme by publishing reports and photographs about the scheme and the award winners.

(Remington Rand News.)

A Sine Qua Non

There is another form of planning which can amount to a firm policy because all the action can be controlled. Such things as safety, welfare, training, housekeeping and suggestion schemes fall into this category. One action now taking place in this respect consists of completely new factory notice boards which will advise people of what is going on in these and other spheres of activity. Nothing can happen without communication and the notice boards are a case of first things first. **(Vista, Viscose Development Coy.)**

The Price of Food

I.C.I.'s canteens, the chief labour officer divulged, were now running at a loss of roughly £750,000 a year. About £400,000 of this was a direct trading loss attributable to wages and purchase of food. Approximately 80 per cent of the cost of a canteen meal today was, roughly speaking, attributable directly to food costs. If food prices went up further, this must inevitably be reflected in higher canteen prices, and it was intended to use the Ministry of Labour's index of food prices as a basis for a revision of prices if revision became necessary; but in any event, said Mr. Grint, there would be no change before June, 1957. **(I.C.I. Magazine.)**

Round-the-Clock Temptation

Colne's canteen works round the clock and meals and snacks are obtainable at any hour of the day or night. The menu beats that of a first-class restaurant. The one I saw listed four different types of soup; snacks on toast; hot or cold rolls and meat pies; tongue, ham and luncheon meat; ham, steak, chop or sausage grills and fried bacon, bread, egg, mushrooms and tomatoes to order; all types of vegetables, fish, salads, enough in fact to tempt the palate of the most finicky night-shift worker. **(Sanaco News: Smith & Nephew Associated Companies Ltd.)**

Sandwich Students

Rolls-Royce, Lord Hives said, supported the University's "thick sandwich" scheme for training engineers.

"Students come for a preliminary year in the works and return again for a second year after completing their B.Sc. courses. They also spend University vacations in our works.

"During the works training period (including vacations) these students are paid the wage for their age. In addition they are given £100 at the end of the first year to help them with their books and their other needs on entering the University. The total cost of this per student to the Company is £1,100."

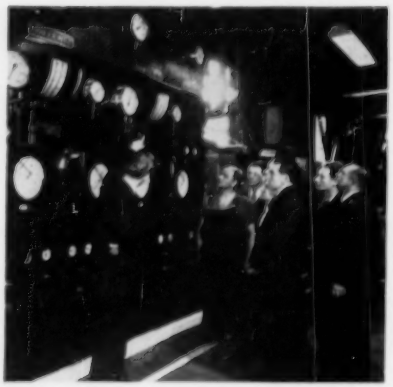
(Rolls-Royce News)

HOW DOES NOISE AFFECT MAN?

Results for studies made of 48 young men with normal hearing at Pennsylvania State College. The men were exposed to sound ranging up to 6,000 cycles per second and held steadily at about 111 decibels—in other words, a loud racket, typical of much industrial noise.

Effects	Not Felt At All	Felt a Little	Felt Somewhat	Felt Quite A Bit	Felt a Great Deal	Total
Disturbance	21	22	5	0	0	48
Nausea	41	5	0	2	0	48
Fright	42	6	0	0	0	48
Pain	36	9	2	1	0	48
Irritation	30	15	2	1	0	48
Distraction	27	17	3	1	0	48
Dizziness	45	2	0	0	1	48
Nervousness	34	12	2	0	0	48
Total reactions	276	88	14	5	1	384

Help Your Boiler Operators Cut Your Firm's Fuel Bill



Visiting factories with up-to-date plant forms an important part of the NIFES course for boilermen. Here, an instructor explains about steam condensate.

Here is an illustrated feature showing how personnel officers can put before the notice of their boilermen the chance to help themselves, their firm and the country in general.

THAT an untrained stoker can waste in one day as much coal as a trained miner can win is a fact that cannot be repeated often enough. That of the present 75,000 to 80,000 boilermen now employed throughout Britain, far too many rely mainly on muscles and a shovel is another unfortunate truth. This, too, despite the excellent training courses available up and down the country for some years. For example, the number of candidates for the Boiler Operator's Certificate of the City and Guilds of London Institute during the past three years gives some idea of the poor response. They are as follows:

1953 144 sat the examination, 115 passed.
1954 756 sat and 590 passed.
1955 959 sat and 788 passed.

These figures include those from the separate courses of the National Coal Board and the Central Electricity Authority as well as those from technical college courses.

This, briefly, is the extent of the problem. To help tackle it is the training scheme started in 1955 by the National Industrial Fuel Efficiency Service (NIFES) designed to remove some of the deterrents that make a boilerman reluctant to take technical training. The NIFES aims at overcoming this *by taking instruction to the men who cannot be induced to come to the class-room.* It is the story of Mahomet and the Mountain in a modern industrial setting.

The course prepares men for the Boiler Operator's Certificate Examination of the City and Guilds of London Institute. To give men confidence in their ability to obtain this certificate, the NIFES course includes a mock examination which simulates the conditions of the real one.

The NIFES course, which is based on the experience of the National Coal Board and the Highgate College of Fuel Technology, lasts for 21 weeks. Every three weeks the men in each study group spend a day with a NIFES engineer on their own plant or a similar one nearby. This is supplemented by home study including material on modern oil-burning plant. Another feature of the course is a series of instructional films illustrating each section. Towards the end a mock examination is held in order to give trainees the confidence to go ahead and take the City and Guilds examination for the Boiler Operator's Certificate.

During 1955 some 92 study groups were formed and over 700 boiler operators enrolled. This year the demand is expected to be much greater and personnel managers should note that mid-October is the final date for enrolment. The fee is five guineas per man and applications should be sent to the Commercial Manager, National Industrial Fuel Efficiency Service, 71, Grosvenor Street, London, W.1.

The great advantage of this course is that during its 21 weeks the boilerman being trained is only away from his

A NIFES instructor shows a group of students where and how the steam is raised.

Wherever possible simple experiments are held in a research laboratory where the students are shown how the moisture, volatile and ash content of coal is measured as well as being taught the general principles of combustion. These points are also brought out in training films specially made for the course.

Home study forms an integral part of the course. Here is one of the country's 75,000 boiler operators studying his way to a better job.

In a room made available by the firm whose premises are being used the students are given an explanation of the theory behind the practical work they have covered during their tour of the boilerhouse.

actual job for a total of 7½ days. NIFES think moreover that if the operator is promised some financial recognition if and when he gains his Certificate, many boilermen will be glad to enrol. Many managements are in fact introducing this incentive.

The only other way, it would seem, of tackling industry's fuel problem would be to make certification compulsory. Since, however, the defeat of the amendment to the Clean Air Bill that " no furnace designed to burn fuel at a rate of five tons a week or more shall be operated . . . except by a person who holds a certificate of proficiency ", this remains an academic issue for the time being.

There are prizes for the best. Here is Mr. Jack Tanner, director of NIFES (right), presenting a £10 prize to a holder of the City and Guilds Certificate at last year's Fuel Efficiency Exhibition.

ACCIDENT PREVENTION!

Management Cannot Go It Alone

Workers Must Be Brought Into the Picture

A READER, Mr. James Wardrop, of Leicester, has written to me on another subject important to all of us. He says:—

"I read your journal regularly and I have just read what you have to say about shop stewards and supervisors. You say that the area of working conditions is a fruitful one for them to co-operate in. I have had an interesting experience on this which your readers might like to hear about. We have a lot of girls working in my department and we have a fairly high rate of minor accidents, mainly in the form of cuts and bruises. The materials we are handling are sharp and if they are stacked or handled carelessly—or if the girls fail to make use of their finger guards—a sharp cut can be the result. My foreman and I spend a lot of time cautioning the girls to be more careful but without much result. Then recently the shop steward for our girls was elected as one of the worker representatives on the Works Accident Sub-committee and she has become very keen on the committee and its work. She has brought the committee round to investigate our work, and talked to the other girls about it. The committee has made some good suggestions for improving our "housekeeping" arrangements. I'm sure our accident rate should show some decline n the near future."

This experience illustrates one of the most significant facts about the promotion of safety and good working conditions generally. Management cannot be effective in this field if it works *alone*—many a newly appointed safety officer has learned this truth the hard way. Starting off with high enthusiasm and many blue-print plans, they have rapidly become discouraged by the lack of interest and inertia displayed by the rest of the factory (including, let it be whispered, some supervisors!).

Somehow the workers have to be brought into the picture, somehow they have to be made to feel that this problem is as much theirs to solve as management's. Otherwise not only indifference and inertia may be the result—but positive hostility. A story is told, for example, of the well intentioned chief executive of a plant in the U.S.A. He decided to give his workers a surprise and when they returned from their annual holiday they found beautiful new toilets and washing facilities installed. Imagine the amazement and disillusionment of this executive when his workers went on strike, giving as their reason that they did not want such magnificent fixtures—they were better than anything any of them had at home and if the chief executive had all that money to spare, why didn't he raise their wages?

Joint accident sub-committees are doing some excellent work in factories up and down this country. We also have many joint health committees in existence, joint recreational committees, joint canteen committees, joint pension committees. Can we have your experiences and views on these and also more discussion on this general subject of working conditions?

This month we have opened a discussion on the effect people who are taking conscious thought can have on accident prevention. Patient observation and experiments are also offering conclusive evidence that production varies without the *conscious volition* of the workers, when such aspects of the physical environment, as heating, humidity, ventilation, lighting and noise, are changed. We must delve more deeply into this subject another month.

WILL AUTOMATION BRING NEW MANAGERIAL REVOLUTION?

AUTOMATION—the most controversial subject of the year. We have heard a lot about its repercussions on the workers—not so much about the many ways in which it is likely to revolutionise the work of management in the next decade. Reports of recent developments of automatic machines in the U.S.A., for example, show that machinery is being used by the small firm as well as the big, that the principle of automation is being applied in shops which handle work of a short-run variety as well as in vast mass production units, and that there is a wide field of routine office jobs just waiting to be automated! Automation will thus become so general that the work of a high proportion of our managers is likely to be affected. The machines are already invented. I see managements and supervisors being affected in at least two of their major activities by these new methods of production.

A major part of all management work is "administrative or executive". Colonel Urwick suggests that this aspect of a manager's work can be sub-divided into six categories—forecasting, planning, organising, commanding, co-ordinating and controlling. The modern manager will soon have precision tools, in the shape of the new computers, to gather and

In this issue Discussion Leader describes automation as "the most controversial subject of the year". NEXT MONTH we feature a special report by Discussion Leader (who is at present in the U.S.A.) on how the American worker is reacting to the introduction of an industrial cult that is sweeping the country. Readers will find much of great interest in this report detailing as it does the constructive attitude of labour to a new force which elsewhere is still regarded with fear and suspicion.

manipulate a wealth of accurate detail without which he may not be able to function in any of these six ways effectively. But the stakes will be higher. The manager will need to have greater foresight. He will need to do more detailed and exhaustive planning. He will have to co-ordinate a complexity of different factors. It is not so easy to say to an automatic machine: "Hey, Bill, come and look at the modifications I've made on that specification"—for the substitute for Bill may not be so amenable to changing horses in midstream!

Then the "commanding" or human and social aspects of management will also call for greater skill. The factory is a social unit as well as a place where material goods are made. The impact of these new methods on the established social structure of an organisation may well be devastating —unless management understands *the full social significance* of the changes they are proposing to make and give as much weight to them in their planning as to the technical and administrative changes. The modern manager can still put Elton Mayo's book "The Social Problems of an Industrial Civilisation" as a MUST on his reading list.

Perhaps the word "social" as I have been using it needs some closer definition. I have used it to denote any interaction between people in society. The use of the word "social" in everyday speech is confined to describing the activity of people who get together in leisure hours, with "getting together" as the main purpose of the exercise. I have given some of my own very tentative thoughts on the effect automation will have on the profession of management. What do you think? We should especially like to hear from those of you who have automated machinery in your plant already.

DISCUSSION LEADER

A Practical Guide to the Factories Act—4

Legal Precautions for Special Plant

As with other machinery, safe working with special plant such as cranes and pressure vessels demands a common-sense legalistic approach. That is why the Acts lay down three main essentials: sound construction, regular maintenance and periodic examination by a qualified person. Backed up by certain special precautions, most of the risk is eliminated.

By V. A. BROADHURST

ONE morning at a certain factory the crane in the yard suddenly collapsed. Fortunately, the men near it were able to scramble to safety and no one was hurt. It was a timber scotch derrick crane of a type seen in factory yards all over the country. At the time of the collapse it was only lifting a light load and everybody at the factory was very puzzled as to why it collapsed. "It gave no previous warning", said one of the men.

The subsequent investigation confirmed that the crane had given no unusual trouble before although it was 40 years old. An engineer had inspected it regularly and his reports were examined but they revealed no fundamental weaknesses. Further investigation showed that the parts of the timber back stays which were buried in the ground were rotten and this was the cause of the collapse.

This case history illustrates what is basically a simple occurrence. After years of use hidden parts of a machine became rotten so that they could no longer support the heavy superstructure and the machine collapsed. Periodical examination had failed to show up the defect.

How does the Factories Act deal with the subject? Firstly, it is worth pointing out that although there was no one injured and this was, therefore, not a notifiable *accident*, it was notifiable to the factory inspector as a *dangerous occurrence*.

The second way in which the Act applies is by virtue of the section of the Act which deals with cranes and other lifting machines. The third application is by certain Special Regulations which refer to special trades and processes only. (For instance, the current Building Regulations prohibit the use of cranes with timber structural members. But these Regulations apply to building operations and not to industry in general.) Needless to say, these different sets of requirements are designed to promote safety in the particular conditions concerned.

In practice, the standard laid down in the Act is the one of general application. The first main requirement is that cranes and other lifting machines must be of good construction and of sound material, adequate strength and be free from patent defect.

On farms and other premises not covered by the Acts, "home made" cranes are sometimes seen. Even the most ingenious amalgamation of iron bedstead and household wringing machine is not allowed on factory premises—except in the unlikely event of the construction being on sound engineering principles. The first essential is sound construction. The second requirement is that the crane or other lifting machine must be properly maintained. This means maintained in an efficient state, in efficient working order and in good repair. The third main requirement is that all parts and working gear must be thoroughly examined by a competent person at least once in every period of 14 months. A register must be kept containing the prescribed particulars of the results of these examinations. (Details are set out in Regulations.) An initial certificate of test and examination is also needed before the machine is first taken into use in any factory.

The fourth requirement of general application is that the safe working load or loads must be marked on the machine. In the case of jib cranes in which the safe load varies, an automatic indicator or a table showing safe working loads for corresponding inclinations of the jib (or radii of the load) must be attached to the machine. Except for testing purposes, overloading is prohibited.

Effective Warning

Other statutory requirements deal with the construction and maintenance of the rails of travelling cranes and tracks for the carriages of runways and transporters. But there is one rather specialised requirement to which attention should be drawn in view of the severe accidents which may result if it is not fully observed:

This says, "*If any person is employed or working on or near the wheel-track of an overhead travelling crane in any place where he would be liable to be struck by the crane, effective measures shall be taken by warning the driver of the crane or otherwise to ensure that the crane does not approach within twenty feet of that place.*"

To illustrate the risk with which this is dealing a case may be cited. One day a painter was near the wheel-track of an overhead crane, painting the gantry girders. The crane driver had been warned that the painter was there. For two days all went well. On the third day a chargehand asked the painter to help him with a job in another part of the works. As a result the painter was absent from the area of the crane for the whole of the morning. He returned during the afternoon and continued his painting. Suddenly, the crane struck him and he was badly injured.

It transpired afterwards that the crane driver had noticed that the painter was not there on the morning of the third day and he quite reasonably concluded that the painting was suspended for the time being. He did not see the painter at work on the afternoon when the accident occurred and did not know that he had returned.

Other types of lifting appliances such as chains, ropes and lifting tackle are dealt with separately in the statute on the same lines generally although the details are different, e.g. the examination of chains is to be done every six (not fourteen) months and they have also to be periodically annealed.

The crane driver must always be on the look-out, but men at work in his vicinity should always let him know of their presence.

The other main class of lifting plant is that of hoists and lifts. (Hoist here means the kind of lifting plant with a cage or platform like a lift.) The detailed requirements are rather complicated as they vary according to the type of hoist or lift, its age and the purpose for which it is used. Sound construction, proper maintenance, periodical examination and the provision of certain safety devices are all called for by the Act.

Pressure Vessels

Another large class of plant dealt with specially under the Act is that of pressure vessels of various types. The Act does not deal specifically with all kinds of pressure apparatus. This is presumably explained by the fact that it passed through Parliament 20 years ago and new types of plant have been designed or have come into use since then.

The Act concentrates on steam boilers, steam receivers and air receivers. For all these the general pattern is the same. The statute lays down detailed requirements for the class of apparatus. Then there follow exemption certificates which modify the application of the Act for certain named types of plant which come within the general group. An example occurred during the current year when the Chief Inspector of Factories issued an exemption certificate for coil type steam generators. Normally these would be subject to the full requirements of the section of the Act dealing with boilers. By this certificate these generators are exempt from one portion of the section. The rest continues to apply in the usual way.

The basic demands of the law in regard to all these steam and air pressure vessels and apparatus are related to their proper construction and maintenance, periodical thorough examination and the provision of safety devices of specified kinds. In addition there are special precautions to be taken in connection with special risks such as that of scalding a person inside a boiler doing repairs. If the boiler is one of a range certain steps may have to be taken to prevent steam or hot water entering the boiler.

The requirements for steam boilers in particular are both technical and complicated—partly owing to the exemptions for certain kinds of plant. Expert advice should be obtained if the precise limits of the field of application of the Act are needed in a particular case. The importance of the periodical examination of steam plant cannot be over-emphasised. An illustration of this is the fact that if a person who is employed to make a thorough examination under the Act fails to do so properly he may be liable to a heavy fine.

That special care is needed with steam receivers was shown in the case of a fatal accident which was reported. (A steam receiver, by the way, is a vessel or apparatus used for containing steam under pressure greater than atmospheric pressure but excludes pipes and coils.) In a certain works there was a steam receiver which had a safe working pressure of 15 pounds per square inch. The steam line feeding it worked at a pressure of 70 pounds per square inch and the steam supply was controlled by a stop valve. A safety valve was provided. After only a few months' operation the receiver blew up and scalded a workman nearby. He died as a result. Investigation showed that there was no reducing valve as required by the Act. The firm's engineer was conversant with the need for a reducing valve when the supply pressure exceeded the maximum safe pressure of the receiver. But what he failed to realise was that the receiver did not have one.

Special Safety Issue

PEOPLE AT WORK

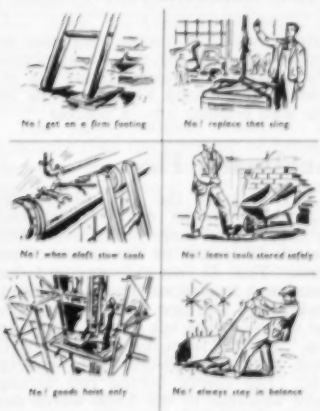
Reportable accidents to people at work in Great Britain total 500 per day. Can you use any of the ideas on this page to play your part in reducing this disturbing total?

Booby Traps

WITH the general slogan "Watch Out For Booby Traps", a National Industrial Safety Week will be launched by RoSPA for the week of November 5-10. The theme will be the cultivation of safe habits with emphasis on the use of hand tools.

Acting on the belief that every workshop is full of booby traps, a collective term to describe every instance of careless handling and maintenance of tools and equipment which might cause an injury, the campaign will seek to make workers safety conscious by means of posters and leaflets illustrating many examples of workroom hazards.

WATCH OUT FOR THESE BOOBY TRAPS


No! get on a firm footing
No! replace that sling
No! when aloft stow tools
No! leave tools stored safely
No! goods hoist only
No! always stay in balance

WORK SAFELY AT ALL TIMES

The assistance of management is asked for in helping to keep the slogans before their workers, and, in addition, the 50 or more local industrial accident prevention groups in Britain will be organising special functions in connection with the campaign—in some cases with the co-operation of the local Civic Head and Chamber of Commerce.

Kidney Punches

"MANY industrial workers are being incapacitated by 'kidney punches'," states the National Chiropractic Association of the U.S.A.

"These body blows," the Association continues, "have been outlawed by boxing because they are particularly damaging. Long ago, fighters learned these punches, delivered to the small of the back, over the kidneys, quickly weakened an opponent and brought about a serious physical deterioration."

The Association points out that some industrial workers aren't so lucky as boxers, and lists air-hammer operators, earthmoving equipment operators, locomotive engineers and truck drivers among those who suffer from the modern version of the kidney punch. **(Occupational Hazards.)**

For Constructive Attitudes to Safety

A CAUSE of many industrial accidents is apathy, a lack of interest on the employee's part, which dulls his reaction to the problem. What, then, can be done to awaken him to a constructive state of safety-consciousness? An article published in a recent issue of "Supervision", an American magazine of industrial relations, suggests two methods—fear and incentive. The first it dismisses as short-lived in its effects, since it lasts only as long as the employee is the object of safety propaganda. But incentive, it claims, can condition the employee's mind at all times, especially if it is based on material reward.

Money, which springs to mind at once, the article rejects; only a large sum would make the necessary appreciable difference to the weekly pay-packet. Merchandise prizes, on the other hand, introduce the employee's family as an interested party (an important added incentive), stimulate his imagination and competitive instinct, boost the winner's morale amongst his workmates, and give him a pride in his firm and work.

Such a campaign, it is suggested, should embrace all hourly-paid staff in the various factory divisions, including foremen and supervisors, who should be eligible for prizes of higher value, since their overwhelmingly enthusiastic support is vital for the scheme's success.

At the end of every month, each member of the winning division (the division with the lowest accident rate for the period) is awarded a "credit" redeemable in items of merchandise. The winners make their choice from a catalogue displaying a wide selection, and the firm takes care of all other details. In the likely event of a division winning more than once it is suggested that "credits" should be allowed to accumulate for more expensive prizes. Five dollars was found from past experience to be an effective minimum.

There are several possible activities which can supplement the scheme, such as contests for safety suggestions, slogans, posters and essays, but whatever the scope or size, the article contends, no scheme will succeed without the attraction of reasonable generosity, and, above all, skilful and continuous promotion.

Inspectorate Impetus

DESPITE the overall economies imposed at present by the Ministry of Labour, it is likely that the Minister will be announcing increases in staff and expenditure in the Factory Inspectorate field. In accordance with his belief that a new impetus should be given to this work, the pay of the Inspectorate is under review with the aim of improving the present position, and it is proposed to increase the number of inspectors; in the Engineering and Chemical Branch numbers are to be increased from 18 to 44.

The only economy intended is that affecting the canteen advisory service, set up under war-time conditions which no longer exist. Arrangements will be made, however, for the chief inspector to receive expert advice on canteen matters.

These proposals were announced recently in a Commons debate on the Factory Acts and factory safety, when it was also stated that at the moment no less than one third of the working population were employed in factories and other places covered by the Act and the Inspectorate.

Elsewhere in the debate it was suggested that every factory employing more than 100 workers should be required under the Factory Acts to provide a surgery manned by a qualified person.

Weld with Care

POINTERS for practical guidance in the safe handling of welding and cutting processes have been incorporated into a booklet entitled "Health and Safety in Welding" published by the Institute of Welding. This 64-page booklet, the first of a series in course of publication, has been compiled by a special committee in response to a demand for guidance on these necessary precautions, with a foreword written by Sir George Barnett, H.M. Chief Inspector of Factories.

Its four sections deal with Gas and Arc Welding and Cutting (with chapters devoted to storage, handling, and care of equipment, safety precautions, protective clothing and general protection), Ventilation and Special Precautions including Radiographic Inspection.

Single copies are available from the Institute at 2, Buckingham Palace Gardens, Buckingham Palace Road, London,

S.W.1, price 2s. to members and 3s. to non-members. Bulk orders of 20 copies or more are 1s. 6d. each, post free to members, and 2s. each to non-members.

Goodbye to all That!

THE R.A.F. is to mechanise its cleaning services, at any rate where floors are concerned. This follows a recommendation by a special committee appointed to make a survey and suggest ways and means of affecting manpower economies in the Royal Air Force.

One of the firms happy about this decision is the *Columbus-Dixon Organisation* of Wembley, with whom the Ministry of Works has placed a contract for 1,789 industrial floor-cleaning and polishing machines. These will be used in messes on R.A.F. stations throughout the United Kingdom. Says the firm:

"No longer will airmen have to go down on their hands and knees scrubbing and polishing floors. Machines, operated by a fraction of the number of men previously employed on these tasks, will now replace the old brushes, mops and pails method."

Scarifying steel plates.

Another firm in the floor maintenance line, *Cimex Fraser Tuson*, is finding that its equipment has a new use in the Royal Navy. One of their machines, a burnisher fitted with brushes of crimped steel and normally used for scarifying industrial floors, is being employed at Rosyth Dockyard on steel plates which are exposed to the weather for long periods and subject to deterioration. Burnishing with this machine keeps them rust-free.

Field for the Young

RECRUITMENT to the British building and contracting industry since the war has been at a satisfactorily high level, according to the Ministry of Labour's annual analysis which shows that 59 per cent of its labour force is under 40 years of age. With the proportion for all industries standing at 50 per cent, this gives it the record for the country.

"Stretched to Our Utmost"

"AN industrial economy, stretched to its utmost, with no reserves of labour to call on" was the general picture presented by the Ministry of Labour and National Service report for 1955. This economy was seeking on the one hand "to heighten production by increased mechanisation and the redeployment of labour and on the other hand to maintain industrial peace through better co-operation and understanding at all levels and through improved methods of personnel management".

Labour was nevertheless restive. The number of working days lost through industrial disputes was the highest in the post-war period—3,781,000 compared with 2,457,000 in 1954. At the same time the gap between the demand and supply for labour widened, but in this setting employers were able to co-operate with the Ministry in helping older workers to find suitable jobs.

Figures indicate the shortage of labour. During the year the total working population mounted to over 24 million (the November, 1955, total of 24,135,000 being a record) yet the number of vacancies rose from 338,000 in December, 1954, to 473,000 in July, 1955, and then fell to 382,200 in December, 1955. Despite this, the post-war trend of a falling level of employment in the basic industries continued and there was again a steep rise in the numbers employed in manufacturing industries and in retail distribution. Achievements noted in the report included:

1. The finding of jobs for over 3,000,000 people through official machinery—2,600,000 by the employment exchanges, nearly 16,000 through the Appointments Service and 430,000 young people through the Youth Employment Service.
2. The placing of 114,000 disabled persons in jobs.
3. The appointment of a Standing Industrial Health Advisory Council to promote measures for the safety, health and welfare of workers.
4. Nearly 3,000 visits to firms were paid by the Ministry's personnel management advisers. The main items on which advice and assistance were sought included: training in all its aspects, but particularly supervisory and executive training; the setting up of new personnel departments or of joint consultation machinery; and problems of labour turnover and absenteeism.

Popular Burden

A BONUS incentive scheme for bus drivers and conductors, based on the number of passengers carried, is to be introduced in Manchester. The scheme was suggested by Manchester Corporation and has been approved by the National Joint Industrial Council.

This move will undoubtedly help to place the busman's job in its true perspective as a service for the public, replacing the all too frequent view of a full load of passengers as a tiresome and unnecessary burden.

Stagger Please

PEOPLE engaged in work in Central London may, in due course, be asked to stagger their working hours as a measure to relieve congestion in that area. A new committee, appointed by the Minister of Transport, and under the chairmanship of Mr. John Fitzgerald—chairman of the London Area Transport Users Consultative Committee—will consider methods of putting this into practice, together with other ways of solving the problem. In connection with this they will consider changes in the daytime population of the area, particularly those arising from the erection of new buildings, and will report progress to the Minister at least once a year.

Nation of Shopkeepers

OF 1,000 apprentices recently questioned in Cologne, the largest number, 112, wanted to be shopkeepers. Fitters, mechanics, motor mechanics and electricians were the next most popular jobs. Bakers, cobblers, carpenters and tailors were a long way down the list. The least popular job—a butcher.

Keyboard Flop

LAST January the U.S. Government decided that its 163,000 typists would be happier and more productive if they, too, could benefit by the march of progress. The 82-year-old standard keyboard was to give way to a "simplified" keyboard. The new machine shifted all the vowels to the left side of the "home row" (second from the bottom) and the most common consonants to its right side. The theory behind this arrangement was that of the 3,800 words most frequently used, 3,000 could be typed on one row.

Tests of the new piece of office ordnance were made using twenty government girls. In July, the results were in—and the new typewriter was out. The tests showed that it would take at least 100 hours to retrain typists on the revised machine. Moreover, standard-board typists improved more in speed tests than did the new-keyboard girls, and the latter made many more mistakes. (**Newsweek.**)

GREATER EFFICIENCY

The theme of next year's Factory Equipment Exhibition will be "Greater Efficiency in Industry". It will be held at Earls Court, London, from April 29 to May 4, 1957.

Eliminate Risk From Factory Catering

By WINIFRED McCULLOUGH
Senior Canteens Adviser, Industrial Welfare Society

Safety programmes sometimes overlook the canteen as a source of accidents. A thousand and one mishaps can occur here, however, not to mention the dire consequences that can follow if food becomes contaminated. This article sets out systems of inspection that should ensure a substantial drop in such serious incidents.

THE canteen uses gas, electricity, steam and power. It necessitates the handling of naked flame, hot fats and liquids, heavy loads and large utensils. The floor may be slippery; uneven surfaces may cause accidents; falling objects are seldom of a harmless nature. All these are hazards for the canteen staff. In addition, the canteen workers themselves, the surroundings in which they work, the tools, implements and equipment they may use, through bacterial content, spread illness amongst themselves and their customers.

The safety aspect receives less publicity than the question of hygiene. Because there is only *one* electric mixer in a kitchen it is often used in a state of disrepair that would be condemned in any large bakery. Because there is only one electric slicer and the cook is "used to it" it is sometimes unguarded, badly adjusted, a potential source of serious accident. The same carelessness can be seen in racks too high for safe stacking of heavy pots, passing space too small for safe carrying of hot awkward loads, gas taps so loose a touch can open them, electric cables frayed, electric contacts faulty.

Much of the neglect of safety and hygiene occurs in smaller canteens run by unskilled, untrained supervisors or by contractors whose terms of reference do not include these aspects of management. The safety officer, doctor and personnel manager between them must administer, install safeguards and make rules in a trade of which, naturally, they know little.

The two check lists that follow are to help this kind of "remote" control. They can be used as a guide and systematically followed up. Most organisations will find new points from time to time and the lists should, therefore, be reviewed and renewed say every twelve months.

The question presents itself as to the advisability of giving a bonus to the canteen staff for freedom from "lost time" accidents and for strict compliance with the standards of cleanliness laid down. Both these are in operation in various firms and both seem reasonably successful. In one instance a yearly bonus of 1 per cent of basic wage is given to supervisor and all staff with a full year's service if accidents and "mishaps" are numerically less than the previous year. In another firm points are awarded for tidiness and cleanliness of persons and premises, good housekeeping generally and the keeping of all foods unhandled and covered wherever possible. There is also a "star" bonus for the canteen attendant voted by her own colleagues the neatest and pleasantest of the year.

Now for the check lists. They are arranged to be operated by DAILY, WEEKLY, MONTHLY and OCCASIONAL inspections. Different people could undertake different aspects. The canteen supervisor should be kept informed of any criticisms and, if considered advisable, the entire canteen personnel could be asked to discuss the rating given and make their suggestions for improvement or alteration in methods, etc.

CANTEEN SAFETY

DAILY

Floor Look for spilled grease. Is there sawdust available to minimise slipping until floor can be scrubbed? Look for excessive water on floor. Find out how it has happened. A smooth floor is very dangerous when wet.

Gangways Are these clear? An attendant carrying a tray of food or crockery cannot see the ground before her feet.

Knives Are sharp knives kept in racks or drawers provided? If in drawers are they all placed in the same direction. A hasty grab at the blade of a French knife has been known to cause a very serious cut.

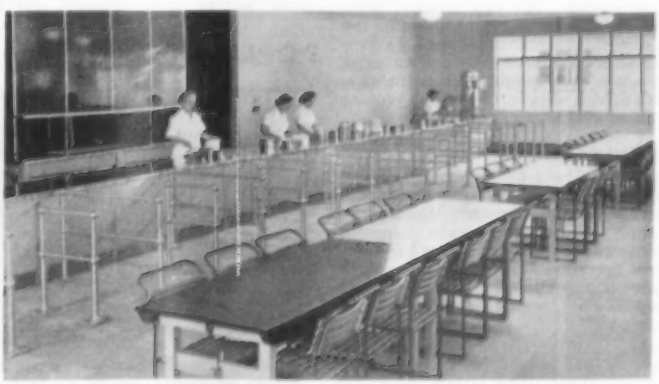
First Aid Box Does it contain in orderly arrangement the supplies recommended by doctor or nurse?

Doors Are cupboard, oven, steamer and refrigerator doors closed? "Bumps into doors" are the third most common canteen accident.

Shoes Are all attendants wearing solid-toed low-heel shoes with leather or rope soles? Rubber soles on wet floors cause accidents every day.

Guards Are all guards on machinery in good repair?

(*Continued overleaf*)



Scrupulously clean and efficient is this new central canteen at **Newton Chambers'** factory at Chapeltown, near Sheffield. More than 500 people can be accommodated at one sitting. Picture shows the 50 ft. stainless steel service counter with its eight service units.

Oven Cloths Are heat-proof oven cloths supplied and in use? Are cooks using two such cloths, one in each hand, to remove dishes from ovens?

Lifting Are women lifting weights too heavy for them (i.e., over 30 lb.)? Are they lifting and carrying weights in the correct way? Is there a small bogey available for heavier loads and is it in use?

Clothing Look at clothing of attendants from safety point of view. Heavy rings and bracelets may "catch" and cause spills. Torn overalls can become entangled with a vessel of hot food.

Temperature Is the temperature right for safe work? Too cold means a slight "unhandiness" that may cause cuts and burns. Too hot certainly means increase of tension, articles literally "falling through" sweating hands and frequent misjudgments as to heights and distances. The safe temperature for a kitchen is between 40° to 60°F. with relative humidity at 50 per cent.

WEEKLY

Floors Is floor space as free as possible from boxes, bins, sacks, brooms, crates, etc.? These should be "organised" into proper storage.

Equipment Look into safety of doors, shelf brackets, switches, insulating materials, plugs, etc. There is always a tendency, often disastrous, to "put off" asking for servicing to be done.

Methods of Work An intensification of inspection of clothing. Are power-driven machines understood and respected? Are hot heavy loads lifted and carried safely? Are attendants taught to walk, not run? If daily inspection on these points has proved unsatisfactory, the weekly period must include instruction and explanation.

Stacking Look in stores and see if cases, etc., are safely stacked. Examine heavy pans in same way. Are heavy items or shelves safe against over-balancing? Are shelves secure?

Size of utensils Are any utensils, when full of hot food or liquid, too big or too heavy for safe handling? Catering supervision wages a constant war against large, deep heavy pans originating in the days when kitchens were run by men. Women find them difficult to handle safely.

MONTHLY

Equipment The maintenance department should make a complete examination of all equipment and machinery, discuss with the supervisor and the person doing the periodic inspections and put in hand any repairs necessary. All disrepair can be dangerous in a kitchen. It can lead also to bad cooking, wasted materials and lack of hygiene.

Premises All floors, ceilings, walls, doors, stairs, ramps, etc., should be examined thoroughly mainly from the safety angle, but also from the points of view of appearance, security and hygiene. Have any cracks appeared in floors? Is there any unevenness? In tiled floors a "lifted" or sunken tile may cause a bad fall.

Personnel The doctor and nurse should report monthly on state of health of personnel as it affects safety. For example, a serious eye condition, a tendency to fits or a very high blood pressure might be considered likely causes of kitchen accidents.

Methods If the daily and weekly reports indicate a need, the monthly inspection can go thoroughly into the causes for bad practices that may lead to accidents. Any recommendations made must be implemented during the following month and brought up again at its end.

CANTEEN HYGIENE

DAILY

Inspect—throats, fingers and wrists for infection of any kind.
Make sure head coverings, overalls, are in good order and that no unsuitable ornaments (such as elaborately set rings and bracelets) are worn.
Make sure no perishable food is out of the refrigerator except for a specific purpose.
Check wash-up arrangements. Are detergents, disinfectants, etc., issued to staff? Is water hot?
Keep an eye open for unnecessary food handling.
Visit cloakrooms. Check soap, towels, nail brushes, paper.
See no food is on shelves or stands less than 18 inches from floor.
Check general cleanliness, especially shelves, sills and under sink area.
Inspect garbage area. Are bins in good repair with lids duly on? Is area well scrubbed down?
Find cause of any unpleasant odour.
Check cleanliness and supply of cloths, mops, brushes, etc.
Look out for signs of unauthorised smoking.

WEEKLY

Visit stores, inspect refrigerators, look in ovens, boiling pans, steamers and fish-fryers. See that no crumbs or other food debris are present in toasters, grillers and kitchen machines.
Check health of any attendant who needed attention at daily hands and throat inspection.
Examine lifts, staircases and entrance lobbies to canteen. Flies, etc., can congregate in these places.
Examine floor under and around all equipment.
Examine vegetable store and preparation.
Examine all sinks and wash-up installations. Are they clear, unrusted and free from leaks? Do the overflows work? Are the garbage containers available and in position?
Inspect all cups and discard those cracked and chipped.
Inspect table tops, bench tops, and *tops* of cupboards and roasting ovens.

MONTHLY

Premises Maintenance department to make sure walls and ceilings are not flaking or powdering. Examine inside and outside of ventilation canopies. At appropriate times of year obtain and fix fly screens. Deal with mice, rats, cockroaches, etc.

Equipment Check wash-up arrangements to ensure ample sufficiently hot water is available. Check refrigerator. Is temperature low and consistent? Is packing and closure of doors in good order? Are sufficient shelves available and fit for use? Examine all equipment inside and out for chipping, scaling and rust. Check efficiency of scrubbing and polishing machines. Discuss with supervisor possibilities of new products, new machines or new methods that would ensure higher standards of hygiene?

Personnel Check on stocks of overalls and caps. With doctor or nurse make sure all personnel who have been ill with colds, skin troubles or digestive upsets are, in fact, fit to be at work in food preparation. Find out if all new entrants during month have been medically examined and passed as suitable. Have they had any induction training on matters of hygiene?

All inspections listed above will take place at fixed times and should be a matter of course, accepted as such by all concerned. In addition, occasional spot checks by the doctor himself or the safety officer or an outside person should be arranged. The occasional check-up should follow no set plan, but attempt to take an overall view of the kitchen in work—noting good and bad points—reporting on deficiencies and suggest ways of improvement.

Safety and hygiene must be continuously stressed by word of mouth and by ever-changing notices. Suggestions, suitably illustrated, could appear for a week and then reappear once or twice. Contests for the best poster designs might be held and small prizes given.

POPULAR BUT . . .

Popular, friendly and traditional but hardly an object lesson in hygienic catering is the tea vendor who still plies his trade by many a factory gate in India. "Brew ups" in Britain sometimes still follow a like pattern.

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21 COLLINGWOOD ST., **NEWCASTLE-UPON-TYNE**, 1 · 1/3 QUEEN'S SQUARE, **MIDDLESBROUGH** · 5 WINDSOR PLACE, **CARDIFF**
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New Industrial Equipment

EXECUTIVES' SURVEY OF AIDS TO INCREASED PRODUCTION

Readers who wish to know the suppliers of any of the products referred to in this section are asked to write to the Editor, quoting the reference number which appears at the end of the paragraph. We are always glad to consider for publication descriptions — preferably accompanied by an illustration suitable for reproduction—of new products.

Safety

NON-MIST VENTILATION

THE real testing point of industrial goggles is their system of ventilation. This is where the *Airflow-Flex* gains over other recently designed goggles, for a fine 4¼ square inch nickel-mesh screen is moulded into the shatterproof frame providing a perfect system of ventilation which does not fog. They can be worn

with spectacles and the flexible frame cleverly and easily detaches from the lens when the latter needs replacement. The frame has the additional advantage of being washable and non-inflammable. **(PM/1152.)**

SAFETY WITH ELEGANCE

SHATTERPROOF lenses are the feature of the new *Style Ize* spectacles. The manufacturers claim that these lenses are fifty per cent lighter and twice as strong as heat treated safety glass of equal thickness. *Optilite* lenses are thermoplastic and can be ground to individual prescriptions. They are resistant to high and low temperatures, chemicals, pitting from hot sparks, acids, etc. The frames into which these lenses are being fitted are wide and strong to give good protection against most industrial hazards. At the same time the frames are simple and attractive so that no one need remove them lest they detract from appearance. **(PM/1153.)**

VERSATILE LENSES

INTERCHANGEABLE lenses in the new *Saf-I-Spec* can easily be clipped out of the frame in a moment for replacement. Made in green or clear acetate they can be used by a variety of workers in engineering shops, machine rooms, etc. Made in two sizes, they are light, can be worn over spectacles and are ideal for supplying to visitors when exploring parts of the factory or works where there is likely to be a showering of sparks or excessive glare. They can be supplied with or without sideshields. **(PM/1154.)**

SMART PROTECTION

OVER three years' research, say the makers, has been spent in evolving these new lightweight *Totector* shoes.

The plain Oxford front has a storm welt and is lined with Protexa fabric which has an increased resistance to breakdown caused by moulds and other micro-organisms. The soles are of Dri-Ped chrome leather, the hardest wearing leather yet known, and the top-pieces are of rubber made by *Dunlop*.

The same specifications are true of the full chrome willow tan full brogues, with the exception that they have, instead of a *Dunlop* heel, a *Sussex* Twin-Grip rubber heel. They comply with B.S. 1870 and are indistinguishable from ordinary footwear. **(PM/1155.)**

QUICK-CHANGE FIRE SUIT

THOSE companies with their own fire-fighting teams will welcome this new fire brigade suit. It is designed for very rapid donning and gives unique protection against the entry of water, foam or other extinguishing media. The

hard-wearing outer fabric is extremely water repellent and, being wool, is fire resistant and gives good protection against heat radiation and flame licking for short periods. Both the outer fabric and the lining are permeable to the water vapour given off by the body and are thus comfortable for constant wear.

The suit consists of a three-quarter-length coat and trousers made with an outer layer of hard-wearing silicon treated wool cloth, while the lining is water resisting but permeable to water vapour. Further protection is given by storm front flaps, a wide storm collar and wrist wind cuffs which are stitched about 4 inches inside the sleeve and present no obstacle to rapid donning, but which give good protection against the entry of water and hot air should the fire-fighting gauntlets be lost. Trousers and knees incorporate several protective features. The suit is made in three sizes, small, medium and large. **(PM/1156.)**

Special Safety Issue

HEAVY DUTY GOGGLE

MAXIMUM protection against dust, chemical and acid splash, fumes, etc., is provided by the *Pulsafe* " Form-Mould " Rubber Goggle which conforms with B.S. 2092 Heavy Duty Anti-Gas and

Chemical Goggle. With or without acid-proof ventilators, the goggles fit comfortably over prescription spectacles, and an adjustable headband gives the correct fit without pressure. Extra comfort is afforded by the resilient soft rolled edges which act as shock absorbers, and the replaceable " toughened " armour lenses give wide vision. **(PM/1157.)**

FOOLPROOF FIRE ALARM

ONE of Britain's leading fire protection and safety engineering firms has designed a foolproof detection system which reacts immediately to any abnormal rise in temperature. The *Pyrene* detecting system, intended for all business and industrial premises and public buildings, consists of a number of groups of up to 16 fire detector heads connected to a control unit equipped with signal lamps, indicating normal operation as well as warning of fire or faults in the circuit. The warning system may be relayed onwards by means of transmitting and receiving units, to one or more fire report centres and to the public Fire Brigade through a G.P.O. telephone line.

It is designed to operate from a 200/250 volt A.C. electricity supply. It is independent of mains supply failure since the power unit incorporates a storage battery continuously maintained by a trickle charger. Should the mains A.C. input be interrupted, the cells carry the load of a complete circuit for a period of time dependent on the capacity of the battery and the number of control units being supplied. Under normal operating conditions this can be as long as 60 hours after breakdown.

A very important advantage is the provision of automatic warning should a breakdown occur. This takes the form of visible and audible alarms which operate instantly whenever a fault occurs in the site installation, the telephone lines, or mains supply. This ensures complete, non-stop electrical supervision of the whole system. **(PM/1158.)**

LIGHTWEIGHT FILTER

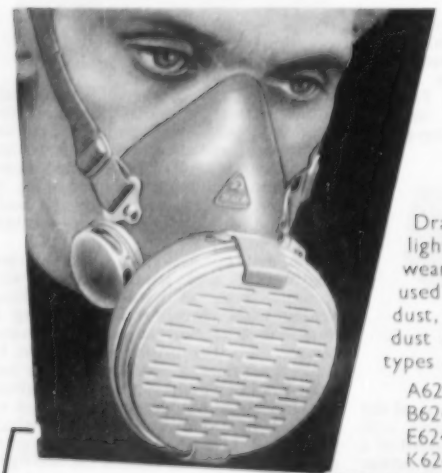
CONSIDERABLE time has been spent in the development of the new *P.V.C.* dust filter which weighs just under 2 oz.

It is fitted with a fine terylene filter and can be used in conjunction with the makers' *Panoramette* ventilation goggle. **(PM/1159.)**

Packaging

LONG-LIFE PACKING CASE

MOST packaging materials often after a single use have to be thrown away. The collapsible *Omnibox*, however, made from steel or hardened light metal, is a packing case with an unlimited service life. With its component parts all rigidly connected to each other,



The DRAGER '74' FILTER MASK

gives 1st, 2nd & 3rd degrees of protection.

Drager 74 filter mask gives protection against dust and gas. The light weight supple perfectly sealed face piece is comfortable to wear for long periods. Interchangeable filters enable the mask to be used on all operations and provides first degree protection coarse dust, second degree protection fine dust, third degree protection dust and gas, solvent fumes, acid gases, chemicals, etc. For various types of gases different gas filters are available.

A624 against solvent fumes and organic vapours.
B624 against acid gases.
E624 against sulphur dioxide.
K624 against ammonia.

protection against dust & gas

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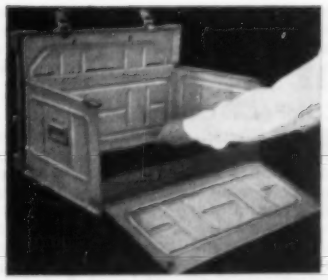

folding and unfolding take only a few simple manipulations, the walls collapse inwards and the whole case folds flat; 500 *Omnibox* cases folded in this way require no more space than is needed to store 100 conventional wooden cases of the same size.

There are no hinges or bolts to hinder packing, since the section roller hinge forms a reliable and tight connection between the walls and bottom of the case and great stability is afforded by the sturdy corner sections. These sections also serve as projections which facilitate stacking.

Unpacking is simple and immediate: two lead seals safeguarding knee-type lock-links are removed and the front tilts downwards.

A tiltable address holder is attached to the cover, on one side of which the consignee's address can be written while the address of the sender is permanently on the reverse side. Thus the holder has merely to be tilted and the case is re-addressed to the sender, yet another time-saving device.

Lead seals, seal wire and punch pliers can be supplied on demand, together with practical, low-priced plastic bags in all sizes as water- and air-tight inner packing material.

The *Postbox* is a similar but smaller version intended for the despatch of parcel post. **(PM/1160.)**

Efficiency Aids

SPEED AND ECONOMY

JUST announced is an entirely new range of tools to twist wire for securing bundles, bags, coils, hampers, etc., without the need for any special ' bag-ties'. The *Unibind* wire twister ties any mild steel wire with a tight twist in a matter of seconds. This speeds up the work very

considerably, at the same time saving up to 50 per cent on the cost of wire by using wire from a handy sized coil instead of special ' bag-ties '.

After placing the wire around the object to be tied and into the slot of the twisting blade, a few pulls on the handle cause this blade to rotate until the wire is tightly twisted. The model illustrated has a spool of approximately 100 feet of 18 gauge wire, sufficient for over 150 ties, and when empty a new spool is inserted in about two seconds.

Another model features a cutter in the place of the wire spool and this enables it to twist also heavier gauge wire to 16 SWG which it cuts off automatically from a coil when the handle is pulled and then continues the twisting. Either design will twist the wire as tightly as

Three features, claimed by the makers, for this *Wraforge* Thumb-turn Wrench are a sure grip, no loose screws, and an ultra-rapid adjustment. **(PM/1161.)**

LIPSTICK FLAVOURERS? **NO!**

SKILLED WORKERS*? **YES!**

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*Nearly 4,000,000 skilled workers read the DAILY HERALD every day.

required and then shear it off at the end of the twist.

The blades are of high-tensile steel and the handles are covered with a new plastic "safe-grip" sleeve. **(PM/1162.)**

TRANSPARENT COVERING

THE *Silktex* process is a unique method of providing paper prints, photographs or fabrics with a cellulose covering that completely encloses the original—back, front and all edges firmly sealed—converting it into a permanent and attractive article which will remain unharmed by dirt, water, oil or grease. It can be applied to any size sheet from one square inch up to 23½ by 17½ square inches. Any shape can be processed and by varying the thickness of the cellulose covering any degree of stiffness obtained. Various surfaces are available, the polished one giving a high degree of transparency, whilst the smooth or rough matt finish is said to be most attractive for showcards and the like. Other features of the covering are that it is washable and waterproof.

The makers say that the process is already being used on an enormous range of articles from price tickets to calendars and business cards. **(PM/1163.)**

LINES MARKED AND MEASURED

LINES up to four inches wide can be marked on factory floors with the *Spraymar* Line Marker. The machine is gravity fed, which eliminates mechanical

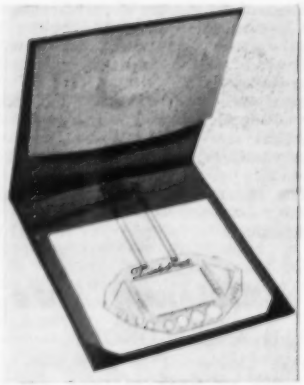
breakdown, and the liquid is controlled by a valve operated by a push rod which is fitted with a lever. To ensure clean lines the spring-loaded squeegee roller is fed by an injection nozzle offset below the tank container.

The five-gallon tank is sealed. It can thus be left unemptied, but is easily cleaned by removing the centre valve. The machine is also provided with an attachment to fit a measuring wheel so that a line can be measured and marked in one operation. **(PM/1164.)**

DRAUGHTSMAN'S AID

THIS unusual device has been produced to assist draughtsmen whether amateur or professional, in the rapid production of sketches, line drawings or electric wiring diagrams.

One of the novel features of the instrument is that it enables people with little



previous experience of drawing or sketching to draw diagrams and other outlines with a fair degree of accuracy, and to scale.

It consists of a plastic template carefully designed and formed to produce varying angles, triangles and rectangles. The scales are in inches and millimetres. Circles have been incorporated in the device with diameters from 1/16 to 1 inch.

The template is toggle-hinged to a folder which acts as a drawing board over which it is adjusted to obtain the correct ruling. The folder is covered in rexine, is 14 in. square and weighs 2½ lb. **(PM/1165.)**

Canteen

VERSATILE MIXER

FOR the medium-sized canteen requiring a pedestal mixer, the *Peerless* is ideal. Based on a simple, modern design, it is strong and versatile, and is equipped with a robust mixing head that ensures effortless mixing. Bowl capacity is 30 U.S. quarts, and the mixing range is

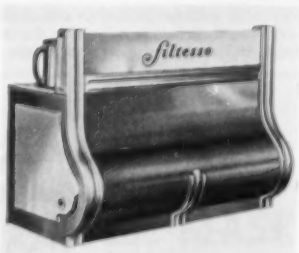
from 1-6 lb. sponge to 18 lb. flour (for bread). Maintenance is negligible, lubrication automatic, and all working parts totally enclosed. **(PM/1166.)**

COMPACT COFFEE MAKER

THE *Filtesso* coffee maker was first introduced to the trade at the Hotel and Catering Exhibition earlier this year. It incorporates many original technical features and a great advantage is that it makes both filtered and continental type coffee served with milk either heated normally or frothed. It is specially constructed to cope with normal or rush demands and therefore covers a wider field of usefulness than most other coffee makers.

Simple to operate, requiring no skilled labour, it is compact, self-contained, and its shape and colouring harmonise with contemporary decorative schemes. The front and side panels are of aluminium anodised in a gold colour flanked by broad mouldings sprayed with a special stove enamel. The serving top is of stainless steel which becomes warm enough to heat cups ready for serving coffee, and the coffee containers are *Pyrex* lined, kept hot by means of an electrically heated, thermostatically controlled water-jacket.

All instructions are permanently marked



and plainly visible to the operator. The water level gauge is clearly indicated and conveniently grouped with the filling control valve and pressure gauge. The outer casing is readily removed for servicing and the steam and water safety valves and overflow pipes are arranged to discharge into a tray fitted under the machine, with a common waste connection.

The *Filtesso* can be heated by gas or electricity. It is easily installed and maintained by a strong after-sales service. **(PM/1167.)**

New Trade Lists

Lincoln Weldirectory. (*Lincoln Electric Co. Ltd., Welwyn Garden City, Herts.*) Gives physical properties and detailed welding procedure for all Lincoln Welding Electrodes.

Mullard Film Service. Series of films on various aspects of electronics suitable for presentation to a wide audience. (*Mullard Film Service, Publicity Division, 1 Gerrard Place, London, W.1.*)

It's a matter of rhythm

Rhythm means a lot in repetition work. When rhythm flags, production drops.

Music-while-you-work recaptures rhythm. Used strategically it can help to keep output at peak level throughout the day.

Ask Rediffusion about its uses. Expert advice on its installation, operation and planning of programmes is freely at your disposal.

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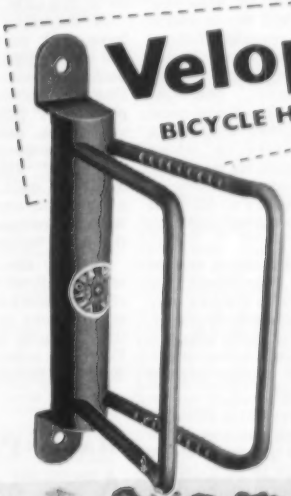
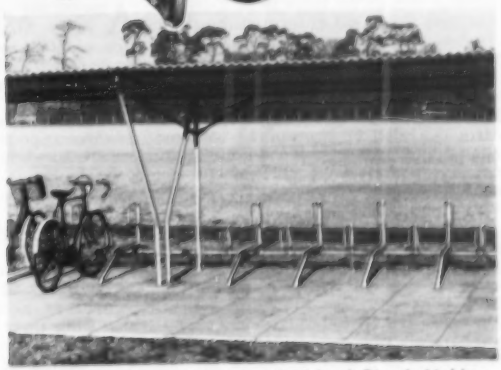
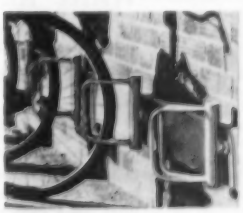


Serrated arms grip tyre only. *Unobtrusive and space saving.* Indestructible. *Heavily galvanised steel.* Wide range of models for any wall, post, railing, etc. *Easily installed by unskilled labour.* NO LIFTING. IDEAL FOR FEMALE STAFF.



Part of a covered stand, fitted with VelopA Bicycle Holders and ramps, supplied to the Middlesex County Council for a new school, for storage at 12-inch centres.



Model RT, 45°, bolted to timber beam.

VelopA holders, 45°, with extended top brackets to suit recessed wall.

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HAS YOUR FACTORY AN EFFICIENT FIRE WARNING SYSTEM?

WHEN a question was asked in the House of Commons in May last year about the Keighley Mill fire in which eight people died, it was revealed that no less than between 50 per cent and 70 per cent of factories governed by the Factories Act do not have fire alarms. The Factories Act requires that a fire alarm must be installed in any factory employing more than twenty workers or where explosives and highly flammable materials are stored or used, and the Ministry of Labour has circulated leaflets to all such factories to guide them in complying with the Act.

The installation of a fire alarm system is a desirable precaution even where it is not required by law. Alarm systems may be either automatic or manually operated.

An automatic system is more effective because it is actuated by a fire itself. This ensures that it will operate even if the building is unoccupied.

A manually operated system is valuable where it is impracticable to install an automatic one and where the premises are extensive enough for there to be a danger of persons being left in them in the event of a fire. If there is an internal telephone system this can be used.

An alarm should be audible in every part of the building and in nearby public thoroughfares. It is an advantage if the alarm can also be transmitted to some central point from which the fire brigade may be called, or if the alarm system can include a direct connection to the fire brigade station.

The simplest types of alarm are handbells, gongs and iron triangles. Although these are effective over a limited area, they do not give a general warning throughout premises of any size, nor do they necessarily give the alarm at a central point from which the fire brigade can be called.

Electric Alarms

All electric fire alarm systems should be operated from circuits that are independent of all other electric installations. The supply of electricity should be from batteries. An indicator board, connected to the alarm system and giving a visual indication of the location of the fire, should be placed in a central position where it is under constant observation. It may be necessary to duplicate the main indicator board, in a caretaker's room, for example, if it is to be under observation when there is not a full staff on the premises.

An automatic alarm system is operated by detectors fitted to the ceilings at calculated intervals. There should be detectors in every part of the building and they should preferably be of the compensating type; that is to say, in addition to operating when a predetermined temperature is reached (usually 150°F.) they should function when there is an excessive rate of temperature rise as there would be in the case of fire.

A manually operated system should have push buttons for the operation of the alarm placed so that everyone in the building is within 100 ft. of a push button. Each push button should be in a prominent position, clearly marked to show the method of operation, and should be covered with glass to prevent accidental alarms and to discourage malicious ones. The alarm should be of a type that, once it has been set in action, will automatically continue to sound until the push button has been reset.

Electric fire alarm systems should be tested daily to make sure that they are in efficient working order and a thorough examination should be carried out every three months by the installing engineers. Further information is contained in *British Standard Code of Practice C.P.*327.404.402.501 (1951) *Electrical Fire Alarms* issued by the British Standards Institution, 2, Park Street, London, W.1, price five shillings. Automatic alarms should be installed in accordance with the Rules of the Fire Offices' Committee for Automatic Fire Alarm Installations, copies of which can be obtained from the Fire Protection Association.

For general guidance on fire protection for industrial managements, the Association has published booklets and leaflets on Fire Extinguishing Equipment, Building Construction to Limit Fire Spread, Fire Protection in Offices and Industrial and Storage Buildings amongst many others. Means of Escape will be the subject of a publication to appear later this summer. All these are available free of charge on application to the Fire Protection Association, 15, Queen Street, London, E.C.4.

M.o.L. Pruning

AMONGST cuts in staff and services in the Ministry of Labour (a reduction of 2,040 by the end of next year), it is intended to reduce the technical and scientific register, and training within industry and personnel management advisory services by 60 persons. Closure of three appointments offices and certain local offices will account for another 500.

These cuts, which are part of the Government's general economy measures, are announced in the August issue of "The Civil Service Argus", the journal of the Ministry of Labour Staff Association. The journal also reports complaints made by staff representatives to the Permanent Secretary and the Minister that while there is to be a cut of nearly 10 per cent at the Ministry of Labour, the Civil Service as a whole is to be cut by only 2½ per cent.

White for Greenhorns

NEW employees working in dangerous areas at the Duquesne Works of *United States Steel Corp.*, Pittsburg, Pa., wear specially painted white helmets during their first 30 days on the job. After that they wear the regular brown helmets of their fellow workers, but while they're learning the work the white helmet helps keep them out of trouble. The old-timers know where the "greenhorn" is all the time and can warn him when he's in danger. **(Manager Magazine, U.S.A.)**

Neurotic Absentees

OF every four Scottish workers absent from work because of illness, at least one is suffering from a neurotic complaint. This startling revelation is made in the annual report published recently by the Scottish Association for Mental Health.

While, as the report shows, the Association is devoting more and more of its attention to this problem of industrial neuroses, it records the comparative success of one approach, as yet not fully developed. This consists of joint meetings with members of the Institute of Personnel Management. By a closer exploration of the symptoms and causes, it may well provide a solution to a problem that has, until now, escaped the notice of many in industry.

Official Truth

FIVE people from different spheres of industrial life—a training officer, general manager, director, production superintendent, and shop foreman—met, under the chairmanship of an officer from the Ministry of Labour, to express their views on the conclusions of the 1954 Report of the Committee of Inquiry on the Training of Supervisors. They related these conclusions to their own experience in industry, and the opinions aired have recently been published in booklet form, the fourth in the "True Story" series issued by the Ministry.

Prepared in collaboration with the Central Office of Information, the booklet is not for sale, but can be obtained on request from the Director of Public Relations, Ministry of Labour and National Service, 8, St. James' Square, London, S.W.1, or from any of the Ministry's local offices.

Horace W. Cullum & Co. Ltd., the acoustic and soundproofing consultants and contractors, have removed to larger and modernized premises at 58, Highgate West Hill, London, N.6. Telephone FITzroy 1221 (5 lines). The firm are exclusive agents for *Acousti-Celotex* tiles.

Summary of Official Publications

READERS' GUIDE TO ACTS, STATUTORY ORDERS, NEW RULINGS AND AWARDS CONCERNING INDUSTRY AND PERSONNEL

GENERAL

Dust Prevention and Suppression Instructional Pamphlet No. 2. Dust Suppression with Power Getting and Loading Machines. Published by Ministry of Fuel and Power. *H.M.S.O.* 1s. 3d.

Workmen's Compensation and Benefit (Supplementation) Bill. Minutes of proceedings of Standing Committee E. 14/6/56. *H.M.S.O.* 4d.

Factory Form No. 278. Factories Acts, 1937 and 1948. Fencing and other safety precautions for power presses. Published by Ministry of Labour and National Service. *H.M.S.O.* 3d.

Choice of Careers, New Series No. 41, Radiographer. 2nd edition, 1956. Published by Ministry of Labour and National Service. *H.M.S.O.* 9d.

STATUTORY INSTRUMENTS

No. 1099. The Fur Wages Council (Great Britain) Wages Regulation Order, 1956. Dated July 16, 1956, made by the Minister of Labour and National Service under Section 10 of the Wages Councils Act, 1945 (a). *H.M.S.O.* 9d. Sets out statutory minimum remuneration payable in substitution for that fixed by the Fur Wages Council (Great Britain) Wages Regulation Order, 1952 (Order Z. (59) amended 1955 by Order Z. (68)) which Orders are revoked. Effective from 3/8/56.

No. 1117. The Milk Distributive Wages Council (England and Wales) Wages Regulation (No. 2) Order, 1956. Dated July 19, 1956, made by the Minister of Labour and National Service under Section 10 of the Wages Councils Act, 1945 (a). *H.M.S.O.* 6d. Sets out statutory minimum remuneration payable in substitution for that fixed by the Milk Distributive Wages Council (England and Wales) Wages Regulation Order, 1956 (Order M.D. (84)) which is revoked. Effective from 12/8/56.

No. 1128. (C. 8). The Workmen's Compensation and Benefit (Supplementation) Act, 1956 (Commencement) Order, 1956. Dated July 20, 1956, made by the Minister of Pensions and National Insurance under Section 2 of the Workmen's Compensation and Benefit (Supplementation) Act, 1956 (a). *H.M.S.O.* 2d. Appoints August 28, 1956, as date of commencement for the purposes of that Section.

No. 1147. The Workmen's Compensation and Benefit (Supplementation) Regulations, 1956. Dated July 25, 1956, made by the Minister of Pensions and National Insurance under Sections 1 (1) (b), 3, 4, and 5 of the Workmen's Compensation and Benefit (Supplementation) Act, 1956 (a). *H.M.S.O.* 6d. Contains miscellaneous provisions relating to award of allowances under the Act, based on corresponding provisions of National Insurance (Industrial Injuries) Act, 1946. Effective from 31/7/56.

INDUSTRIAL DISPUTES TRIBUNAL

AWARDS

No. 851. Observance of Specified Terms and Conditions of Employment by a Firm of Electrical Contractors at Winchester. Claim: That the employers should observe the rates of pay and conditions of employment laid down by the National Joint Industrial Council for the Electrical Contracting Industry, with particular reference to the payments for overtime rates. **Award:** Claim established. (6/6/56.)

No. 854. Claim for Overtime Payments to Certain Part-Time Workers Employed by a Particular Firm at Battersea. Claim: That part-time women workers should be paid at overtime rates for work performed outside the recognised shortened day. **Award:** Claim established. Effective immediately. (12/6/56.)

No. 856. Rates of Wages of Workers Employed by a Firm of Lead Manufacturers at Southwark, London. Claim: That existing wage rates be increased by 3d. an hour with effect from February 7, 1956. **Award:** Claim established with effect from beginning of first full pay period following date of award. (14/6/56.)

No. 857. Claim for an Alteration to Certain of the Rules contained in the National Working Rules of the Scottish Painting Council. Claim: That Rules 2 and 10, relating to time lost through inclement weather and notice of termination, should be altered, to bring them into line with similar rules contained in the Working Rules of the Scottish National Joint Council for the Building Industry. **Award:** Claim established. (19/7/56.)

No. 858. Observance of Specified Terms and Conditions of Employment, in respect of their Water Engineer and Manager, by the Manchester Corporation. Claim: That the Corporation should pay their Water Engineer and Manager a specified salary in accordance with a decision of a sub-committee of the Joint Committee for Water Engineers' Salaries. **Award:** Claim established, effective from January 20, 1956. (20/6/56.)

No. 859. Remuneration of the Staff of a certain Trustee Savings Bank in Scotland. Claim: That minimum salary scales for male and female staff employed at the Border Counties Trustee Savings Bank shall be those applicable to the Trustee Savings Banks generally in Great Britain. **Award:** Claim established, effective from May 21, 1956. (28/6/56.)

No. 860. As above, referring to Stirling District and County Savings Bank.

No. 861. As above, referring to Kirkaldy and District Trustee Savings Bank.

No. 862. As above, referring to Inverness Savings Bank.

No. 863. As above, referring to Dunfermline and District Savings Bank.

No. 864. Remuneration of Two Deputy Chief Officers of the Corporation of the County Borough of Blackpool. Claim: That the Corporation should apply to the post of Deputy Borough Treasurer and that of Deputy Borough Engineer and Surveyor, Scale F and E, respectively, of the scales included in the First Schedule of the Memorandum of Recommendations dated May 27, 1952 (as later amended) of the Joint Negotiating Committee for Chief Officers of Local Authorities. **Award:** Claim established, effective from April 1, 1953. (29/6/56.)

No. 865. Remuneration of Full-Time Agents Employed by the Co-operative Insurance Society Ltd. Claim: For the payment of an agency allowance and an increase in commission rates, re-writing fees and quarterly bonus. **Award:** Claim not established. 29/6/56.)

No. 866. Remuneration of Domestic and Similar Grades of Staff employed in Hospitals and Allied Institutions in the London Area. Claim: That the London weighting for the workers concerned shall be increased to 11s. per week. **Award:** London weighting to be 8s. per week, effective from the beginning of the first full pay period after 3/7/56.

No. 867. Remuneration of a Senior Administrative Assistant employed by the Middlesex County Council. Claim: That County Council should adopt Scale G of the Salary Scales included in the First Schedule of the Memorandum of Recommendations dated May 27, 1952 (and as later amended) of the Joint Negotiating Committee for Chief Officers of Local Authorities, in respect of the post of Senior Administrative Assistant in its Education Department. **Award:** Salary scale applicable to this post shall be Scale F, effective from September 1, 1954. (6/7/56.)

No. 868. Rates of Wages of Maintenance Engineers employed by the Corporation of the City of Edinburgh. Claim: That maintenance engineers employed in various departments of the Edinburgh Corporation be paid wages and conditions not less favourable than those embodied in the agreement arrived at by the Joint Negotiating Committee for Local Authorities' services (Engineering Craftsmen) England and Wales. **Award:** The hourly rate of wages of workers concerned shall be 4s. 5d. Question of working conditions referred back for further negotiation, effective from beginning of first full pay period following 10/7/56.

No. 869. Grading of a Certain Officer Employed in the National Health Service in Edinburgh. Claim: That Supervising Officer of the Ophthalmic Services Department, with additional duties, should be graded in Grade E of the Scheme of Conditions of Service of the Administrative and Clerical Staffs Council. **Award:** Claim established effective from October 1, 1954. (11/7/56.)

No. 870. Wages of Press Photographers employed by certain members of the Council of Photographic News Agencies. Claim: That employers should adopt specified weekly rates of wages in accordance with length of experience and service. **Award:** Fully qualified press photographers' weekly wage shall be £16 as from September 6, 1955, and £16 16s. as from first pay day following March 15th, 1956. Weekly wages for press photographers not fully qualified, and those on non-regular engagements, referred back for settlement by agreement. (13/7/56.)

CIVIL SERVICE ARBITRATION TRIBUNAL

AWARDS

No. 313. Experimental Officers of the Air Ministry engaged on Television Weather Forecasts. Claim: That the allowance of £1 10s. per appearance paid to Experimental Officers of the Meteorological Office engaged on Television weather forecasts should be increased to £2 10s. **Award:** That the allowance shall be increased to £2 for each appearance. (7/6/56.)

No. 312. Chart Depot Assistants employed in Ceylon. Claim: That the pay (exclusive of special local allowance and bonus) of the locally entered

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ST ALBANS

Chart Depot Assistants (male) in Ceylon shall be Rs. 250 × 12—Rs. 370 per month with effect from January 1, 1952. **Award**: That the pay (exclusive of special local allowance and bonus) of the above Assistants shall be Rs. 200 × 10—Rs. 300 per month, effective from January 1, 1952, and that the "corresponding points" principle be applied in the assimilation to the new scale of officers in post. (14/5/56.)

No. 314. Assistant Assizer, Assizer and Senior Assizer in the Standard Weights and Measures Department, Board of Trade. Claim: For increase in salary scales with retrospective effect. **Award**: That the salary scales (London, male) of specified grades shall be: Assistant Assizer—£395 × £20—£475 × £25—£550 (minimum linked to age 21 with weight for age up to 25), Assizer—£550 × £25—£750 × £30—£780, Senior Assizer—£800 × £35—£975. The above salary scales shall attract Pay Supplement from July 1, 1954, and additional Pay Supplement from July 1, 1955, and April 1 1956. Normal Civil Service Provincial Differentiation shall apply, and "corresponding points" principle shall apply in assimilation to new scales of officers in post. (6/7/56.)

INDUSTRIAL COURT AWARDS

No. 2616. Fair Wages Resolution. Complaint against George Wimpey & Co. Ltd. **Award**: Claim not established. (18/7/56.)

No. 2617. National Health Service—Nursing Assistants Class I—Claim for increase in salary scales. Reference: To determine a difference between Management and Staff sides of Nurses and Midwives' Whitley Council arising out of staff side's claim for an increase in maximum salary scale for Nursing Assistants Class I. **Award**: Claim not established. (18/7/56.)

September Management Diary

BRITISH PRODUCTIVITY COUNCIL
6 **ISLINGTON CENTRAL LIBRARY, LONDON, N.7.** "Productivity in the Office." Afternoon course for office managers, senior clerks, costing and accounting staff, production control and progressing staff, senior staff in industry, commerce and local government, etc.

BURTON MANOR
9-14 "Introduction to Supervision." Course for junior foremen and charge hands.
30 Sept.–5 Oct. "Management in the Smaller Firm."

CENTRAL COUNCIL OF PHYSICAL RECREATION
30 Sept.–6 Oct. **Lilleshall Hall, Shropshire.** A Refresher Course for Industrial Social and Sports Club Secretaries and Officials.

INDUSTRIAL WELFARE SOCIETY
4-8 & 8-12. **Keble College, Oxford.** "The Approach to Industrial Responsibility." Seventh Annual Conference for Apprentices.

INSTITUTE OF PERSONNEL MANAGEMENT
11-14 **Cambridge.** Overseas Conference.

INSTRUMENT SOCIETY OF AMERICA
17-21 **New York.** International Instrument-Automation Conference and Exhibition. Apply: T. G. Scott & Sons, Ltd., 143/7 Regent Street, London, W.1.

INSTITUTION OF PRODUCTION ENGINEERS
27-29 **Leamington Spa.** Materials Handling Convention.
29-30 **Ilkley.** Halifax Graduate Weekend School. "Some Aspects of the Elements of Administration". (Apply to: Mr. M. W. Alderdice, A.M.I.Prod.E., *Vapalux Ltd.*, Queen's Rd., Halifax.)

NATIONAL INSTITUTE OF INDUSTRIAL PSYCHOLOGY
10-14 **London.** Course in Selection Methods Part III.
17-19 **London.** Three-day course for Supervisors.

SALES CONSULTANTS Ltd.
21 & 22 **Leicester.** "How to Select and Train a Successful Sales Force." Weekend study course for directors, sales and advertising executives.

SUNDRIDGE PARK
16 Sept.–6 Oct. **Bromley, Kent.** "Measurements for Management." Course for senior executives.

New Courses

THREE courses in management and supervision are announced for the autumn by the London Polytechnic Department of Management Studies.

The first, a course on the financial background for policy-making, will be held on Wednesdays from 2 to 5 p.m. for fifteen weeks beginning on October 3. The course will be a practical one, including group discussions as well as lectures, and will study the way in which income is generated and saving and investment take place.

The second course which opens in October will cater for foremen and supervisors, and will aim at giving some insight into human relations problems on the shop floor. It is also intended to give the supervisor a wider appreciation of the work of the personnel manager, the works study engineer, the cost accountant and others, through guest speakers who will talk about their various departments. There will also be six optional visits to industrial concerns of special interest.

On November 5 the Social Skills of Management course begins, consisting of three fortnights of full-time attendance, linked by field work. The course is now in its fifth year, and a number of alterations in the syllabus and refinements of teaching techniques have been incorporated into the course which is now designed to teach applied leadership concentrating on the function of executives in managing people.

Transfer Request

IT came as a surprise to Mr. Francis B. Willmott, the Birmingham industrialist, when two staff members of one of the firms he controls asked to be transferred to the works' payroll. It seemed to him quite possible that there might be an increasing number of employees who would find it financially preferable to belong to the works, where overtime rates render earnings more flexible.

Consequently he has sent a circular to all his employees, asking whether they would prefer a fixed weekly salary or payment by the hour. The choice is theirs, for, as Mr. Willmott says, "I shall not mind if anyone prefers a transfer to the works".

In Brief

A LABOUR union in Yokohama, Japan, has asked shippers not to employ longshoremen who sell their blood. Blood is worth 20 dollars a pint in the city; and a lot of stevedores have sold so much of it that they've weakened themselves physically and become accident-prone. **(Occupational Hazards, U.S.A.)**

THE use of electricity for off-peak space heating, industrial heating, and for factory lighting will be the main features of the stand of the Electrical Development Association at the Fuel Efficiency Exhibition at Olympia, October 2—10.

Advance Linen Services Ltd. were recently granted a certificate by the Royal Institute of Health and Hygiene covering not only their towel cabinets but "the purity, quality and merit" of their *Towelmaster Service*.

Appointments

MR. H. WILMOT, C.B.E., chairman and managing director of *Bever, Peacock and Co. Ltd.*, has been elected chairman of the council of the British Institute of Management. He succeeds **MR. H. S. SPENCER** who has been elected a vice-president of the Institute.

CAPTAIN V. D. OXBURY has been appointed new chief security and fire officer at *Ruston & Hornsby Ltd.*, Lincoln.

Obituary

THE recent death of **SIR RICHARD LLOYD-ROBERTS** will be regretted by all concerned with human relations in industry. A devoted worker in this cause for over thirty years, he was a pioneer in the development of industrial joint consultation, and twice held office as president of the Institute of Personnel Management.

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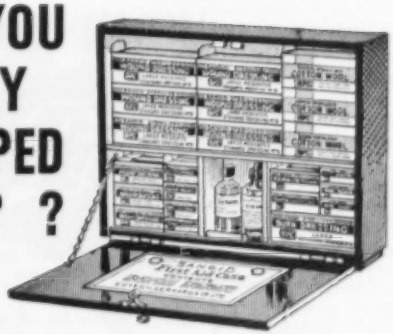

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The Safe Use of Radioisotopes

(*Continued from page 134*)

work is frequently low as only small amounts of activity are used, but as the sources are usually unsealed, care must be taken to control the contamination risk.

Differentiation should be made between the control measures necessary for process control and those for experimental work. Where experiments are in progress some relaxation of control standards can be permitted if the work is being supervised by a competent scientist who is aware of the hazards associated with the work. Where the active material is used in processes and is left untended, more stringent precautions are necessary to prevent unauthorised access to the material or its misuse.

The increasing use of radioactive substances (also high-energy and X-ray machines) in industry will not only call for the dissemination of information on safe handling, but will also require the introduction of special legislation. At present, special regulations apply only to the luminising process, but regulations for other applications will undoubtedly be introduced under the provisions of the Factories Act (1937). Provision is also made under the Radioactive Substances Act (1948) for regulations concerning safe handling and safe disposal of radioactive material.

Advice on radioactive safety matters is available from the Factory Department of the Ministry of Labour and National Service and also from the Radiological Protection Service at Downs Hospital, Cotswold Road, Sutton, Surrey—which will give both advice and a monitoring service to those engaged in work involving radiations.

With the enforcement of legislation, and with the advice and aid of these organisations, there is every reason to believe that the general introduction of radioactive substances into industry will be achieved in complete safety and with no detriment to the life or health of those who work with them.

CANTEEN ADVICE BUREAU

We are contemplating the re-equipment of our canteen kitchen, and are considering the purchase of the following items:—

1 *2-pan fish fryer.*
1 *potato peeler.*
1 *potato chipper.*
1 *hot cupboard.*
1 *steamer.*
1 *mixer.*
1 *stainless steel wash-up sink unit (2 compartments).*
1 *under-counter pressure boiler.*

Our dining room caters for approximately 100/150 people and we would like the above equipment to have the capacity of say, 200.

Can you please advise us as to reliable suppliers of the above in respect of quality and price, and any other information which you think might be of use.

(JFK, Belfast.)

I ENCLOSE a list of suppliers of the particular equipment which you require and I have made the appropriate comment as to price and suitability.

I should like to point out that while you could easily obtain the items which you have listed from separate manufacturers it would be better in your case to deal with one supplier. I consider that your best plan would be to submit a rough sketch of your canteen kitchen showing floor area dimensions, position of windows and doors, relation to dining-room and to adjoining stores and offices so that you might obtain the best advice on the lay-out of the items which you propose to buy.

You do not say whether you intend electricity or gas for your fish fryer—usually the unit cost of the fuel supply is the factor which determines the choice.

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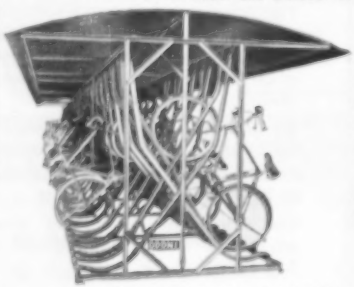

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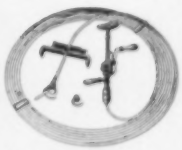

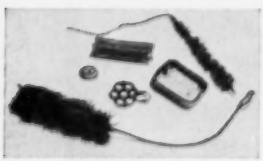

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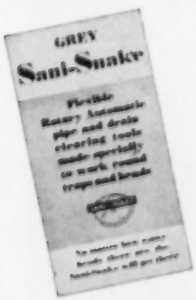

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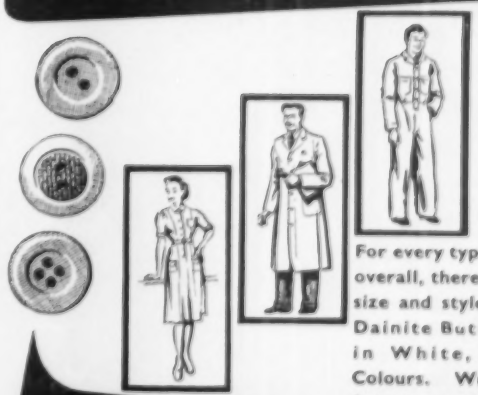

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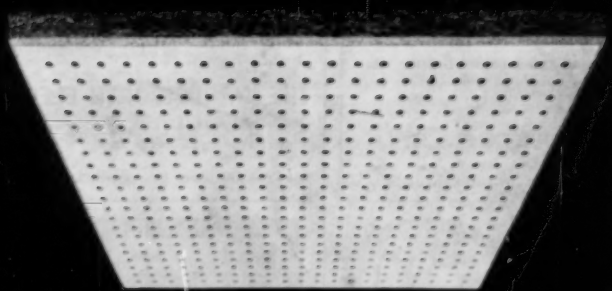

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